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FORTY-SIXTH ANNUAL REPORT

OF THE

SUPERINTENDING ENGINEER

PUBLIC HEALTH ENGINEERING DEPARTMENT

UNITED PROVINCES

FOR THE YEAR ENDED 31st MARCH, 1941



ALLAHABAD.

SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES, INDIA

1942

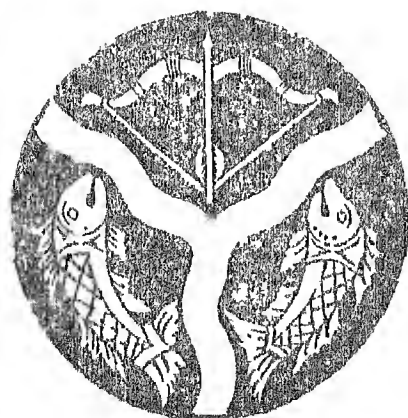
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FORTY-SIXTH ANNUAL REPORT
OF THE
SUPERINTENDING ENGINEER
PUBLIC HEALTH ENGINEERING DEPARTMENT
UNITED PROVINCES

FOR THE YEAR ENDED 31st MARCH, 1941



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2. The expenditure on works carried out by the department during the year amounted to Rs.3.48 lakhs and the total value of works for which projects including preliminary proposals and forecasts of cost were framed amounted to Rs.47.89 lakhs.

Fees and realizations.

3. An amount of Rs.51,112 was earned in fees for works carried out for local authorities. These fees are levied in accordance with Government orders only on the duties undertaken under item 2 of the foregoing table. The fees earned on the supervision of construction amounted to Rs.24,392, while the fees earned on the preparation of projects amounted to Rs.26,720, making up the total referred to.

In addition to the above fees, a sum of Rs.4,732 was recovered for hire of tools and plant from contractors. A further sum of Rs.696 was realized as supervision charges on the value of works carried out in the workshops of the Well Boring Operations Division, Cawnpore.

Budgets of local authorities.

4. The budget schedules of the local authorities received in this office reveal that a total turnover of Rs.105.22 lakhs took place during the year under the heads "Revenue" and "Expenditure incurred on piped water supplies, hydro-electric works and drainage pumping stations." Those municipalities which provided a piped water supply incurred a total expenditure of Rs.43.15 lakhs on these supplies during the year.

Water supply

Number of undertakings.

5. There are now 25 public water supply undertakings in the province as against 12 in 1920. Twenty-three of the undertakings are managed by local authorities, and two, Aligarh and Moradabad, by licensed undertakers, as permitted by the amendment to the Municipalities Act of 28th October, 1933. The number of municipal hydro-electric undertakings, viz. two, remains the same as last year. The capital invested in the waterworks controlled by local authorities has now reached the figure of Rs.3.56 crores.

New waterworks at Brindaban, Moghal Sarai, Orai and Etawah are under construction and other schemes would have materialized if it had not been for the out-break of the war.

Population served and cost of supply.

6. A total urban population of 2,290,368 is now supplied with piped water by the 25 undertakings; the concerns owned by the municipalities serving 2,160,363 and the two private concerns 130,000. The average daily supply afforded during the year under review amounted to 50,000 million gallons and the maximum average in any one month to 58,409 million gallons. The total consumption was 36.56 gallons per head per day at the highest in the province and 2.33 gallons at the lowest. The cost per thousand gallons of water supplied amounted to 0.81 annas at Meerut, the capital charges having been liquidated, and to 2.46, 2.62, 1.43, 1.83 and 2.63 annas respectively at Agra, Allahabad, Benares, Cawnpore and Lucknow. The total cost per thousand gallons at Mussoorie, which is the highest in the province, amounted to 16.55 annas.

There are 11 towns in the Province with a population of over one lakh and of these Bareilly, Shahjahanpur and Saharanpur have no piped water supply. It is understood that the Bareilly Board has been negotiating with a private company to supply water within municipal limits but nothing definite has yet been decided.

There are 11 towns with a population ranging between 50,000 and 1,00,000 and of these only six have a piped water supply. Of the smaller municipalities numbering 36 with populations ranging from 20,000 and 50,000 only five possess waterworks.

It will be seen from these figures that there is considerable scope for expansion for all the towns with populations exceeding 20,000 at present dependent on shallow open wells which should have a piped water supply system.

Profit and loss.

7. The following Boards made a profit out of their waterworks.

Agra, Allahabad, Benares, Cawnpore, Lucknow, Mussoorie, Naini Tal, Dohra Dun, Jhansi, Mirzapur, Muttra, Fyzabad, Hardwar, Haldwani and Ghazipur. Deficits were incurred at Meerut, Unao, Kosi, Fatehpur Sikri, Gola Gokaran Nath, Almora, Hathras, and Jaunpur.

General remarks on the maintenance of waterworks and drainage works.

The census figures for 1941 disclose an enormous increase in the population of most of the towns in the Province. The population of Cawnpore has just about doubled and the percentage increase in the population of Lucknow, Agra, Allahabad, Benares and Meerut is 38.51, 23.67, 41.71, 26.10 and 23.83 respectively. The larger municipal waterworks with perhaps the exception of Cawnpore have not kept pace with the increase in population and the

boards, have not taken any steps to control the supply, so scarcity continues unabated, and in the summer months in most of the outlying areas of all the large towns there is a water famine. Complaints from the public are rife and in an effort to meet the demand most of the large water-works are taxed beyond their capacity, and all pumping units are brought into commission with the result that there is no standby plant whatsoever in most of the towns. The public blame the boards for this state of affairs but on the other hand resent any scheme for reducing waste if it involves the imposition of meters which is really the only effective remedy. Conditions have steadily deteriorated from the outbreak of the war, and the position now is extremely serious and in most of the large towns there would appear to be no other alternative but to reduce the hours of supply still further.

Drainage conditions have also deteriorated and the pollution of the rivers in the vicinity of the larger towns has become a scandal. The drainage pumping stations at Lucknow and Allahabad are worn out and due to the war there is little prospect of affecting any worth while improvement. The problem of sewage disposal at Cawnpore will be accentuated when the new zone pumping stations come into operation and the daily supply is increased to a figure of 1,500,000 gallons.

The smaller towns in regard to water supply and drainage facilities are much better off than the larger towns and their management would also appear to be more effective. There is not the same intolerance to the imposition of meters and in some towns, e.g. Dehra Dun, Hathras, Jaunpur and Unao waste is kept within reasonable limits.

9. Almost all local authorities are reluctant to enforce the penalties prescribed in the Act and in their own bye-laws on persons found wasting water with the result that little improvement has taken place in reducing the percentage of unaccounted for water which in some Municipalities has reached alarming figures. The Government order issued in 1935 regarding night tests is not being properly applied by some of the boards under the pretence that such tests do not serve any useful purpose. The smaller undertakings which have metered all connexions can account for over 90 per cent. of the water consumed while the larger boards with comparatively few metered connexions can only account for about 50 per cent. to 60 per cent. of the water supplied.

Waste Prevention Measures.

10. The only satisfactory method, the results of which can be guaranteed, of preventing waste and keeping the demand within reasonable figures is the application of meters, but the Boards, particularly of the large towns, are averse to this measure.

Metered supply and control.

11. Such of the local authorities which have acted on the advice of this Department and have metered all connexions can now account for most of the water supplied to the public, and the percentage of unaccounted water, which is the acid test of successful management, has been brought down to reasonable figures which compare very favourably with the results obtained by well managed concerns in other parts of the world.

Direction.

The small towns of Unao, Kosi, Fatehpur Sikri, Hathras and Jaunpur can account for approximately 92.62, 97.10, 94.25, 96.43 and 90.70 per cent. of their total supply while the larger towns such as Lucknow, Agra, Cawnpore and Allahabad can only account for 29.95, 61.65, 44.39 and 49.73 per cent. respectively. This difference is mainly due to the fact that the management does not take vigorous steps to prevent waste by imposing meters and does not apply other measures recommended by this department for reducing waste.

Shortage of water in large towns.

12. This problem has become perennial and is faced by almost all the large towns in the province, and although the increase in population is responsible to some extent, the position would have been infinitely better if waste prevention had been properly tackled in the past. Extensions and reorganizations will give some relief but it will not be of a permanent nature and the old conditions will resume unless the consumption is kept within reasonable limits and this can only be done by strictly applying waste prevention measures and imposing more meters. Cawnpore, Lucknow, Allahabad, Agra, Muttra and Jhansi are either extending or are contemplating extending their water supplies, but this will be of little avail, I am afraid, unless at the same time more vigorous steps are taken to prevent misuse of water. Those of the smaller towns which have introduced compulsory metering are in a much better position to meet the additional demand due to increase in population.

13. No improvement can be recorded. Great difficulty is experienced in obtaining properly qualified personnel at the rates of pay offered and the service is not attractive. The larger Boards were advised to recruit suitably qualified

Waterworks staff.

persons as apprentices and to give them systematic training in the different branches of a water supply undertaking, but so far no effective action has been taken. Some of the Boards have not properly graded the posts with the result that when there is a vacancy, unskilled persons are generally appointed.

Water Law and
Model Byelaws.

14. The United Provinces Water Supply Inquiry Committee appointed by Government to advise on many outstanding matters pertaining to waterworks concluded its labours on October 15 to 17, 1910.

Important recommendations of a far-reaching character were made for the more efficient management of the existing water supply undertakings and these will be incorporated in the report which, it is hoped, will be submitted to Government towards the end of the year 1941.

Sewage Pumping
Stations.

15. There has been no important additions to the Municipal Sewage Pumping Stations. The number remains at six as in the previous year. As reported last year, the Lucknow and Allahabad stations are now obsolete but owing to war conditions there will be some difficulty in obtaining new pumping units.

Drainage Condi-
tions.

16. No improvement worth mentioning has been effected in the drainage conditions in the 84 Municipalities in the province. Conditions continue to remain as unsatisfactory as in previous years.

Sewage Purification.

17. The construction of sewage disposal works has not kept pace with the installation of waterworks. A few of the larger towns are partially sewered but there is not a town in the province equipped with what may be termed a modern up to date drainage system and sewage purification works.

Sewage purification in the towns having underground sewers is confined to land treatment and providing there is a sufficient area available this gives good results. But with the big increase in water consumption in all the large cities, there is considerable doubt if this method of purification can be relied upon in future to deal adequately with the resulting sewage. Large areas of land are required and this is not always available on the fringe of large cities having piped water supply. It would appear in the near future that land treatment will have to be supplemented by some form of artificial treatment if the rivers, the condition of which is steadily deteriorating due to pollution, are to be improved.

Developments.

18. Some Municipal Boards such as Allahabad, Cawnpore, Benares and Lucknow are making substantial profit from their waterworks after paying interest and sinking fund on loan funds, and if this is not spent on improving the waterworks, it should be utilized on improving the drainage conditions of these towns which are steadily deteriorating.

Health works other
than drainage and
water supply.

19. Due to the financial stringency no major health works other than water supply and drainage schemes have been undertaken by the department during the year.

Fire fighting measures.

20. In the last year's report it was mentioned that Government had circularized the different Boards in United Provinces drawing their attention to their responsibilities under section 7 (1) (P) of the Municipalities Act in regard to rendering assistance in extinguishing fires and protecting life and property.

This question has gained considerable importance in view of the extension of hostilities and it is understood that Government has the matter under consideration and orders will issue shortly.

Housing conditions.

21. As reported last year, all the three Improvement Trusts appear to be taking more interest in slum clearance and providing cheap and suitable houses for the working classes.

It is understood that the Allahabad Trust has made provision in the Sultanpur Bhava Scheme and George Town Extension Scheme for some houses for the working classes. Two new schemes are also under submission to Government.

The Cawnpore Trust provided Rs.40,000 in their budget for 1940-41 for the construction of about 165 quarters for workmen in Raipurwa and Sisaman Nala Trust areas, but these could not be constructed during the year under report as sanction of Government was not received in time. A comprehensive scheme for the construction of workmen's dwellings is, however, under the consideration of Government.

As regards Lucknow, some labourers' quarters were constructed by the Trust during the year in the Industrial area.

The effect of War con-
ditions on municipal
undertakings.

22. Owing to the prevailing war conditions great difficulty is being experienced in obtaining pumping plant, machinery, spare parts and all articles of iron and steel manufacture. So little progress is being made with new works and the condition of the existing works is suffering on this account. The prices of some materials have increased abnormally and even then they cannot be easily obtained.

and a priority certificate is necessary. On account of these difficulties the completion of several important schemes has been considerably delayed.

23. The post of Superintending Engineer was held throughout the year by Mr. F. D. Tunnichiffe, M.C.

Staff.

The post of Personal Assistant to Superintending Engineer, Public Health Department was held by Mr. S. G. Naravane, who also acted as Secretary, Board of Public Health. During his absence on leave from April 19, 1940 to July 13, 1940, the post of Personal Assistant to Superintending Engineer and the Secretary, Board of Public Health was held by Mr. Maqbul Husain, Assistant Engineer. Mr. Naravane was also on leave for the periods from 2nd to 23rd December, 1940 and from the 25th March to 9th April, 1941, during which time the current duties of the posts of Personal Assistant to Superintending Engineer as well as that of Secretary, Board of Public Health were carried out by Mr. Tunnichiffe in addition to his own duties.

The post of Waterworks and Mechanical Engineer continued to be held by Mr. C. W. Cassé, and the post of Assistant Engineer (Mechanical) by Mr. N. R. Gupta.

The office of Executive Engineer, I Division, Public Health Department, Meerut, was held by Mr. H. G. Trivedi throughout the year.

Mr. K. Chattopadhyaya continued as Executive Engineer, II Division, Public Health Department, Allahabad, throughout the year.

Mr. N. D. Choudhry continued as temporary Executive Engineer, Well Boring Operations Division, Cawnpore.

In addition to the staff enumerated above, one permanent Assistant Engineer, four temporary Assistant Engineers, two officiating Assistant Engineers, two unpaid Student Engineers, nine Overseers, nine Temporary Subordinates and the requisite number of computers, draftsmen and clerks were employed. One temporary Assistant Engineer of this department was deputed for special training in malaria engineering under the Rockefeller Foundation Authorities from February 1, 1941 for a period of six months.

The Superintending Engineer, the Waterworks and Mechanical Engineer, Mr. Trivedi, Executive Engineer, I Division, Public Health Department, Meerut and the Personal Assistant to Superintending Engineer continued to serve on the Committee appointed by the Government to inquire into the problem of water supply in the United Provinces as Chairman, Members and Secretary, respectively.

The staff of the department has during the year rendered assistance to the Thomason Civil Engineering College, Roorkee, the Lucknow University and the Registrar, Departmental Examinations, Allahabad, as examiners on engineering subjects.

The department has had a very busy year and the staff on a good many occasions, particularly the staff engaged on work in connexion with the United Provinces Water Supply Inquiry Committee, has put in many extra hours to keep abreast with the work. Several important works could not be undertaken due to lack of funds and conditions arising due to the war.

Mr. C. W. Cassé, the Waterworks and Mechanical Engineer reports as follows in regard to the condition of the pumping plant at the different waterworks and drainage pumping stations :

Most of the pumping plant is extremely old and totally inadequate for modern requirements. It has been maintained as well as can be expected in view of its age. The Board has been recommended, as it may be some years before the complete scheme of reorganization can be carried out, to purchase a steam unit of 4,000 gallons per minute capacity, but no action has been taken.

Most of the pumping plant is extremely inefficient and unsuitable for present day working conditions and the main filtered water pumps have no standby. The auxiliary tube well pumping plant has been badly maintained, having been fitted with locally made spare parts which have not given good service.

The plant is old and unreliable and should be replaced by something more efficient and up to date. It is not very well maintained.

The pumping plant is well maintained but additional units and accessories are required to meet present day working conditions.

The waterworks is being completely re-equipped with new pumping machinery, but the scheme has not yet been put into operation owing to delays due to the war. When the new plant is working, it should be adequate for the areas supplied, but additional plant is required for other areas, as well as spare pumping units and spare parts.

Condition of Waterworks and Drainage pumping plant.

Agre waterworks.

Allahabad Waterworks.

Allahabad Main Drainage Pumping Plant.

Benares Waterworks.

Cawnpore Waterworks.

Cawnpore drainage.	The two pumping plant units at Pormatghat pumping station are inadequate for present conditions and a third pump is required.
Lucknowl Water-Works.	The present filtered water pumping plant is incapable of meeting requirements and there are no standby units at times of maximum demand. There is also a shortage of spare parts. A new unit, which will improve the situation, has been on order for some time but another unfit red pumping plant is also required for which no orders have yet been placed.
Lucknow drainage.	Up to date efficient sewage pumps are required, the old plant is worn out and most inefficient.
Meerut Water-works.	The pumping plant is extremely old but is still capable of meeting the needs of the area supplied with piped water in Meerut but there is no proper standby and the Board has been recommended to proceed with a scheme for the replacement of the plant by up to date efficient water turbine driven pumps.
Mussoorie Water-works.	The main pumping units at the various stations, although many are old, are maintained in good condition and there is a reasonable complement of spare parts. Additional units are required, however, for pumping sources of supply which are urgently required to meet ever increasing consumption.
Mussoorie Hydro Electric Plant.	This has been reorganized within recent years and is well maintained and capable of meeting demands except when insufficient water is available at the headworks. The standby mesel engine generating plant at Dehra Dun has also recently been augmented, but complete overhaul and adjustment of the older units is necessary.
Naini Tal Water-works.	The pumping units generally are well maintained but more funds are required for carrying out detailed recommendations.
Naini Tal Hydro-Electric Plant.	This has given cause for some anxiety for the plant has been working for 20 years without proper overhaul. Action is required to improve its maintenance by the employment of better staff.
Jhansi Waterworks.	The pumps are very old and are steam-driven. Schemes have been prepared for their replacement by modern plant, but no orders have yet been placed.
Muttra Waterworks.	Orders have recently been placed for new standby units. The existing pumps are in fairly satisfactory condition.
Muttra Drainage.	The pumping plant requires attention and new units have been recommended.
Fyzabad Water-works.	The plant is fairly well maintained but the diesel units require more careful handling, several accidents have occurred which have led to damage.
Hardwar Water-works and Drainage.	Most of the pumping plant both at the Waterworks and the Drainage Pumping Station is in good order and capable of meeting present day demands.
Unao Waterworks.	The oil engines require overhaul and there is a serious shortage of spare parts and there is little standby.
Kosi Waterworks.	There is only one oil engine driven unit to keep the supply going and this frequently breaks down and few spare parts are available.
Fatehpur Waterworks.	The water supply is dependent on one oil engine unit and the supply has to be shut down when this is overhauled.
Colagokaran Waterworks.	The two very old oil engines, upon which the supply depends, have completely worn out and are repeatedly breaking down. The Town Area Committee responsible for the supply has been recommended to completely replace the pumping plant.
Hathras Water-works.	The plant which is electrically driven has been giving satisfaction and is capable of meeting present day demands.
Jaunpur Water-works.	The plant is in fair order and there is sufficient standby to meet present demands.
Ghazipur Water-works.	There is only one unit upon which the supply depends and no proper spare parts or tools and plant are available. Additional tube well and pumps have been recommended.
Free advice to local bodies.	Free advice has been tendered to a large number of Boards on multitudinous matters. Advice has also been given to most Government departments on matters pertaining to sanitation and water supply.

F. D. TUNNICLIFFE, M. C.

Assoc. M. Inst. C. E.,
Superintending Engineer,
Public Health Department,
United Provinces.

LUCKNOW:

26th November, 1941.

for information. Pie
page 23. no. M. Tal. M.
programme of the

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UNITED PROVINCES, FOR THE YEAR ENDED 31st MARCH,
1940.**

The table shows the extent of the duties undertaken by this department during the year under review :

Item number	Nature of work	Amount involved in lakhs of rupees	Remarks																												
1	Duties under the Local Authorities Loans Act, 1914, and the Municipalities Act, 1916, i.e., the supervision and inspection of all open water works, drainage pumping stations and hydro electric supplies.	77.12	<p>This amount represents the turn over in revenue and expenditure on water supplies, drainage pumping stations, sewage farms and hydro electric supplies and is made up as follows.</p> <table> <tr> <th></th><th>Revenue</th><th>Expenditure</th><th>Total</th></tr> <tr> <th></th><th>Rs.</th><th>Rs.</th><th>Rs.</th></tr> <tr> <td>Water Works</td><td>33,27,040</td><td>28,51,816</td><td>61,78,865</td></tr> <tr> <td>Drainage pumping stations</td><td></td><td>1,45,118</td><td>1,45,118</td></tr> <tr> <td>Sewage farms.</td><td>70,607</td><td>23,217</td><td>93,824</td></tr> <tr> <td>Hydro electric supplies</td><td>17,22,741</td><td>16,01,047</td><td>33,23,788</td></tr> <tr> <td>Total ..</td><td>41,20,397</td><td>36,21,198</td><td>77,41,595</td></tr> </table>		Revenue	Expenditure	Total		Rs.	Rs.	Rs.	Water Works	33,27,040	28,51,816	61,78,865	Drainage pumping stations		1,45,118	1,45,118	Sewage farms.	70,607	23,217	93,824	Hydro electric supplies	17,22,741	16,01,047	33,23,788	Total ..	41,20,397	36,21,198	77,41,595
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Total ..	41,20,397	36,21,198	77,41,595																												
2	Local works— (a) Preparation of projects .	13.92	18 detailed proposals.																												
	(b) Construction ..	3.12	Payments made.																												
3	Provincial works— (i) Miscellaneous— (a) Preparation of projects	0.80	23 detailed proposals.																												
	(b) Construction ..	0.54	Payments made																												
	(c) Maintenance ..	0.12	Lucknow Gomti Weir, Ghazaluddin Hyder Canal, Anti-Malaria works, Allahabad Magh Mela and Executive Engineers, I and II Divisions' offices and residences.																												
	(ii) Allahabad District Public Works Department Works— (a) Preparation of projects	0.16	3 detailed proposals.																												
	(b) Construction ..	1.08	Payments made.																												
	(c) Maintenance																													
4	(a) Advice free to local authorities.	27.81	15 forecasts of cost with reports supplied free.																												
	(b) Advice free to Government Departments.	0.17	4 forecasts of cost with reports supplied free.																												

*This figure includes revenue and expenditure for Hardwar Electric Supply.

Item number	Nature of work	Amount involved in lakhs of rupees	Remark
5	Board of Public Health business—		
	(a) Examination of projects for urban works	49.36	52 projects and 17 forecast of cost with report supplied for.
	(b) Examination of projects for rural sanitation.	1.61	333 projects were continued.
	(c) Checking progress on urban and rural areas works, G. O. nos. 163/XI, dated the 6th February, 1931, 470/XI, dated the 6th February, 1931, 580/XI, dated the 11th February, 1931 and 490/XI, dated the 9th April, 1931.	0.97	Proper report collected and consolidated for the Accountant General, United Provinces.
6	Examination of projects for Provincial works.	1.24	33 projects and 1 forecast of cost were examined.
7	Inspection and reports on works carried out by local bodies.	2.02	
8	Scrutiny of certain municipal budgets, G. O. no. 4718/XI 1011, dated the 6th January, 1933.	110.26	This represents the total figure of original budget schedule of income and expenditure of local authorities in towns providing piped water supply, drainage pumping stations and hydro-electric supplies.

N. B.—The figures for the Allahabad District Public Works Department Works have also been supplied to the Chief Engineer, Public Works Department, Buildings and Roads Branch, for inclusion in his annual report as required by Public Works Department, Buildings and Roads Branch G. O. no. 957/MS/217/MS-252, dated the 7th December, 1936.

2. The expenditure on works carried out by the department during the year amounted to Rs.5.49 lakhs and the total value of works for which projects, including preliminary proposals and forecasts of cost were framed amounted to Rs.42.97 lakhs.

FEES AND REALIZATIONS.

3. An amount of Rs.11,275 was earned in fees for works carried out for local authorities. These fees are levied in accordance with Government orders only on the duties undertaken under item 2 of the table above. The fees earned on the supervision of construction amounted to Rs.33,165 while the fees earned on the preparation of projects amounted to Rs.11,110, making up the total referred to.

In addition to the above fees a sum of Rs.3,879 was recovered for hire of tools and plant from contractors. A further sum of Rs.686 was realized as supervision charges on the value of works carried out in the workshops of the Well Boring Operations Division, Calcutta.

BUDGETS OF LOCAL AUTHORITIES.

4. The budget schedules of the local authorities received in this office reveal that a total turnover of Rs.110.26 lakhs took place during the year under the heads "Revenue" and "Expenditure incurred on piped water supplies, hydro-electric works and drainage pumping stations." Those municipalities which provided a piped water supply incurred a total expenditure of Rs.41.69 lakhs on these supplies during the year.

WATER SUPPLY

NUMBER OF UNDERTAKINGS.

5. There are now 25 public water supply undertakings in the province as against 12 in 1920. Twenty-three of the undertakings are managed by local authorities and two, Aligarh and Moradabad, by licensed undertakers, as permitted by the amendment to the Municipal Act of 28th October, 1933. The number of municipal hydro-electric undertakings, viz., two, remains the same as last year. The capital invested in the waterworks controlled by local authorities has now reached the figure of Rs.3.43 crores.

New waterworks at Brindaban, Moghal Sarai, Orai and Etawah are under construction and other schemes are under contemplation and would have materialized if it had not been for the outbreak of the war.

6. A total urban population of 1,666,061 is now supplied with piped water ; 1,566,061 by the concerns administered by local authorities and 100,000 by the two undertakings managed by licensees. The average daily supply afforded during the year under review amounted to 48·180 million gallons and the maximum average in any one month to 55·869 million gallons. The total consumption was 43·01 gallons per head per day at Benares, the highest in the province and 3·13 gallons at Gola Gokaramnath, the lowest. The cost per thousand gallons of water supplied amounted to 0·84 annas at Meerut, the capital charges having been liquidated, and to 4·00, 2·53, 1·53, 1·74 and 2·43 annas respectively at Agra, Allahabad, Benares, Cawnpore and Lucknow. The total cost per thousand gallons at Mussoorie, which is the highest in the Province, amounted to 19·17 annas.

POPULATION
SERVED AND
COST OF
SUPPLY.

In the Province there are eight first class municipalities with a population of over one lakh and of these Bareilly is the only town without a piped water supply. It is, however, understood that a private company is negotiating with the Board for the grant of a licence to supply water within municipal limits.

Of the second class municipalities numbering ten with a population ranging between 50,000 and 100,000, six towns have a piped water supply. The third class municipalities with populations varying between 20,000 and 50,000 number twenty-eight and only three possess waterworks. Thus in the different classes of municipalities, thirty have no piped water supplies.

It will be seen from these figures that there is a considerable scope for extension as in these enlightened days towns with a population of over 20,000 should not be dependent on open wells, most of which are contaminated, for their water supply.

7. The following boards made a profit out of their waterworks : Allahabad, Cawnpore, Lucknow, Meerut, Mussoorie, Naini Tal, Mirzapur, Muttra, Hardwar and Unao.

PROFIT AND
LOSS.

Deficits were incurred at Agra, Benares, Dehra Dun, Jhansi, Fyzabad, Kosi, Fatehpur Sikri, Almora, Gola Gokaramnath, Haldwani, Hathras, Jaunpur and Ghazipur.

8. In spite of the fact that the pumping plant at most of the waterworks is inadequate and at some places antiquated, water supply in all the towns was maintained throughout the year without any serious breakdown in either the plant or the distribution systems.

MAINTENANCE
OF THE
WATERWORKS
AND WATER
SUPPLY IN
GENERAL.

More economical working of the waterworks would result if advice tendered by the officers of this Department was given effect to.

Extensions to the distribution systems in most towns have been carried out haphazardly by the local authorities with the result that in almost all cases the pumping capacity and the pressure in the mains is totally inadequate.

Waste prevention measures in most towns are not vigorously applied and any reorganization will not be effective for long until the importance of efficient control is realized.

Water supply, in those towns which have all metered supplies in regard to the percentage of unaccounted for water, compares very favourably with well managed undertakings in other parts of the world.

The Waterworks and Mechanical Engineer has recommended the adoption of suitable waste prevention measures in all the towns having a piped water supply but in most cases his advice has not been followed. In Allahabad, Muttra and Gola Gokaramnath, although consumption has increased, income has decreased. This should reveal to the Boards that matters are not what they should be in regard to control.

Cawnpore Municipality has proceeded with its reorganization scheme and Lucknow Board has issued instructions for the preparation of detailed proposals for the reorganization of its distribution system. The outbreak of the war has, however, seriously interfered with schemes for improvement and development in most of the towns. Many of the schemes should have been taken in hand before and much leeway will have to be made upon the cessation of hostilities.

Kosi and Fatehpur Sikri notified areas are anxious to duplicate their pumping plants. It is hoped that Government will be able to give loans for this purpose.

**WASTE
PREVENTION
MEASURES.**

9. The Government order issued in 1935 on measures to be taken to prevent waste has not been complied with by the majority of the Boards. Some Boards are even reluctant to conduct night tests at regular intervals on the plea that more water is consumed during the tests than normally, while others consider that adequate action is taken if warning notices are served on the transgressors.

**METERED
SUPPLIES AND
CONTROL.**

10. The installation of meters on connexions where the consumption is found to be in excess of the quantity permitted under the rules, or where the water is used for purposes other than domestic has not progressed to any extent and the loans given to the Allahabad and Lucknow Boards for the purchase of meters to be applied in such cases has been mainly utilized for the purchase of meters to replace unserviceable stock. The boards are generally reluctant to adopt such methods for preventing waste.

The few boards that have adopted universal metering from the inception of these waterworks are in a much happier position, for almost all the water pumped can be accounted for while other boards are always faced with a water famine during the summer months and consequently have to restrict the supply and incur heavy capital expenditure on large schemes of extensions to allay public opinion.

DIRECTION.

11. Those local authorities which have accepted the advice of the department and have metered all connexions can account for approximately 90 per cent. of the total supply and such boards alone can be said to be successfully managing their waterworks undertakings.

The small towns of Unao, Hathras, Kosi, and Jaunpur can account for 87.89, 94.21, 97.32 and 95.04 per cent. respectively of their total supply, while the larger towns such as Lucknow, Cawnpore and Agra can only account for 39.63, 50.22 and 57.89 per cent. respectively. As this is the acid test of successful management, it is obvious that there must be something wrong and the fault is with the direction which refuses to vigorously enforce the by-laws and to adopt waste prevention measures as advised.

**SHORTAGE OF
WATER IN THE
LARGE TOWNS.**

12. Shortage of water in the outlying areas of practically all the large towns has become a perennial problem. There is no doubt that there has been a considerable increase in the population in most of the towns since the last census and the distribution systems have not been reorganized to meet the increased demand. But there is little hope of any permanent improvement even if the supply is increased and the distribution systems remodelled unless the by-laws, particularly in regard to checking waste and misuse of water, are strictly enforced. Cawnpore has embarked on a big scheme of reorganization and the Lucknow Board has issued orders for the preparation of a detailed scheme for the reorganization of its distribution systems and scheme for the complete reorganization of the Agra water supply is under preparation. But the expenditure which will amount to over 50 lakhs will be of little avail if the direction is not prepared to run the undertakings on proper lines.

**WATERWORKS
STAFF.**

13. This Department will shortly send up a detailed scheme for training waterworks personnel, as there is a shortage of skilled staff in practically all the waterworks. There is no dearth of suitable candidates as facilities are available in schools and colleges throughout the Province for theoretical training but provision for practical training is totally inadequate.

**WATER LAW
AND MODEL
BY-LAWS.**

14. *The United Provinces Water Supply Inquiry Committee*—The United Provinces Water Supply Inquiry Committee appointed by Government to advise on many outstanding matters pertaining to waterworks assembled on 31d April 1939, and meetings were held throughout the year. It is hoped that the report will be issued towards the end of 1940.

**SEWAGE
PUMPING
STATIONS.**

15. No further additions during the year under review have been made to the Municipal Sewage Pumping Stations which now number six. On the whole they have functioned fairly satisfactorily. The Lucknow and Allahabad stations are now obsolete and the Waterworks and Mechanical Engineer has recommended that they should be completely reorganized.

**DRAINAGE
CONDITIONS.**

16. Drainage conditions in most of the towns in the Province continue to remain as unsatisfactory as in the past and nothing has been done to improve matters. The towns which have underground drainage systems are only partial

serviced and extensions are badly needed. The larger towns such as Agra, Allahabad, Lucknow, Cawnpore and Benares are all faced with the problem of reorganizing their drainage system and purifying the sewage in an efficient manner before it is discharged into the rivers. The condition in most of the smaller towns is chaotic as apart from a few surface drains no provision is made for the disposal of sullage. These towns cannot possibly finance the cost of installing a comprehensive drainage system. But a beginning can be made if schemes are prepared and divided into a number of working instalments and the construction is spread over a number of years. The problem is ice-nituated in that a number of towns, if conditions were normal, would proceed with water supply schemes and the lack of drains is a deterrent to any advice being made in this direction.

The pollution of the rivers in the neighbourhood of all the large towns by the discharge of raw sewage has reached alarming proportions and is a constant menace to the health of the public.

17 Sewage is purified by its application to land in the few towns that have sewage works. The area of land available is insufficient for its proper treatment and artificial methods such as the Activated Sludge Process will sooner or later have to be adopted if the pollution of the rivers is to be prevented.

SEWAGE PURIFICATION.

In all the large towns there is now a demand for the installation of sanitary fittings but lack of sewers retards progress in this direction. A considerable number of septic tanks are now being constructed in residential areas due to the failure of the boards to provide proper drainage facilities. Septic tanks have their limitation and if not properly maintained become a nuisance, and there is no doubt at all that property owners should not be driven to use this expedient for the disposal of sewage. Ways and means should be considered of providing up-to-date drainage schemes in all the Class I Municipalities as this is a natural corollary to the introduction of a piped water supply.

18 The Agra, Allahabad, Benares, Cawnpore and Lucknow Boards should be pressed to tackle this problem in real earnest. The profit made from the waterworks in some of the towns mentioned is sufficient to pay interest and sinking fund on a loan that would go a long way towards rehabilitating the drainage system. The plea of poverty in these cases should not be accepted as an excuse for not making any advance.

DEVELOPMENTS.

19 Due to the financial stringency no major health works other than water supply and drainage schemes have been undertaken during the year under review.

HEALTH WORKS OTHER THAN DRAINAGE AND WATER SUPPLY.

The Allahabad Municipal Board is anxious to complete the construction of an infectious diseases hospital estimated cost Rs 1,97,691, before the Kumbh Mela of 1942 and has approached Government for a loan of Rs 50,000 to enable a start to be made and it is hoped that the work will be taken up shortly as it is eminently desirable that some provision should be made for the treatment of such cases before the mela commences.

20 The provision of suitable fire fighting equipment in the smaller municipalities is not progressing as it should.

FIRE FIGHTING APPLIANCES.

Some time ago Government circularized the boards drawing their attention to their responsibilities under section 7(1) (P) of the Municipalities Act in regard to rendering assistance in extinguishing fires and protecting life and property when fires occur. A large number of the boards were advised by this department as to the purchase of suitable fire fighting appliances. But most of them have expressed their inability to proceed further in the matter due to financial stringency. However, one or two boards have evinced keen interest and are in correspondence with the manufacturers of fire fighting apparatus regarding the supply of suitable equipment.

An outbreak of fire occurred at the Magh Mela, Allahabad, early in 1939, and the writer in reporting the matter to Government emphasized the importance, as a serious fire occurred at the last Kumbh Mela, Haridwar, of maintaining suitable fire fighting equipment at the important Melas. Government replied that the organization of a fire brigade to be manned by the Police for dealing with fires at the different Melas and fairs was under consideration. Later, a discussion took place between officers of the two departments and the Police were supplied with

full information as to the requirements in regard to mechanical plant. Subsequently a sum of Rs. 15,000 was provided in the Police Department budget for the purchase of suitable equipment. But consequent on the outbreak of war and the urgent need for economy Government decided that the expenditure should not be incurred and the matter be postponed until the termination of the war.

The Kumbh Mela at Allahabad falls due in 1942 and it is imperative that the matter should not be left in abeyance. Some action in any case should be taken in 1941.

HOUSING CONDITIONS.

21. All the three Improvement Trusts seem to be more alive to the importance of slum-clearance in the interest of public health and to their responsibility in providing cheap and suitable houses for the working classes.

At Allahabad, a beginning has been made in slum-clearance by the initiation of the South Housing Scheme (Part II) and the Sultanpur Bhaawa Scheme. The Trust reports that it has provided better living accommodation for labourers. So far ten quarters have been built and eighteen more are under construction. Similar proposals are under consideration for the George Town area. Here the Trust proposes to construct 13 quarters to suit family requirements.

The Cawnpore Trust reports that no new quarters for the working classes have been constructed during the year 1939-40 but private enterprise has erected 400 quarters in the different areas in which the Trust is operating. Further, a scheme for the construction of 1,000 quarters for workmen has been prepared and is under consideration by Government.

No special progress in this direction has been reported by the Lucknow Trust excepting that a small portion of scheme no. 7 (Industrial area scheme) has been reserved for the erection of quarters on sanitary lines for labourers. It is understood that construction will be taken in hand shortly. This Trust in the past has launched many important schemes but the middle classes seem to have been fitted to a greater extent than the working classes as numerous plots have been made available for outright purchases on which houses have been erected by private enterprise. It is desirable that more attention should be paid to the provision of suitable accommodation for the working classes.

EFFECT OF WAR CONDITIONS ON MUNICIPAL UNDERTAKINGS.

22. At the outbreak of the war comprehensive reports were submitted by Mr. C. W. Cassé, Waterworks and Mechanical Engineer, on the municipal Waterworks and Hydro Electric undertakings from the point of view of the war emergency and subsequently the Waterworks Superintendents were asked to submit a list of their requirements such as machinery, spare parts, pipes and fittings for three years, the estimated duration of the war, as it was anticipated that grave difficulties would arise as the war progressed in obtaining materials in which iron and steel was used in the manufacture. Later, the chairmen or some influential member along with the Waterworks Superintendent discussed the matter with the writer and the Waterworks and Mechanical Engineer. It was found that most of the Boards were short of essential spares and materials and practically all of them were unable to finance the purchase from funds at their disposal. The matter was reported to Government and it was eventually decided that short term loans would be made available to those boards who were not in a position to finance the expenditure from income. Delays in complying with the procedure laid down before a loan can be issued are inevitable and it is feared that meantime prices will have increased and supply facilities become more difficult.

STAFF.

23. The post of Superintending Engineer was held by Mr. F. D. Timmichlife, M.C., until 6th April, 1939, when he proceeded on leave ex-India and again from 7th October, 1939, until the end of the year. During his absence Mr. H. G. Trivedi, Executive Engineer, officiated as Superintending Engineer.

The post of the Personal Assistant to Superintending Engineer, Public Health Department, was held throughout the year by Mr. S. G. Naravane, who also acted as Secretary, Board of Public Health.

The post of the Waterworks and Mechanical Engineer was continued to be held by Mr. C. W. Cassé, and that of his Assistant by Mr. N. R. Gupta.

The office of Executive Engineer, I Division, Public Health Department, Meerut, was held by Mr. G. H. Trivedi up to 6th April, 1939, and again from 7th February, 1940, until the end of the year. Rai Bahadur Utaf Rai, Assistant Engineer, held charge of the division during the period from 7th April to 8th July, 1939, and Mr. N. D. Chaudhuri, temporary Executive Engineer, on return from medical leave, held charge of the division from 9th July, 1939 to 6th February, 1940.

Mr. K. Chattopadhyaya continued as Executive Engineer, II Division, Public Health Department, Allahabad, throughout the year.

Mr. Syed Maqbul Husain, Assistant Engineer, continued to officiate as Executive Engineer, Well Boring Operations Division, Cawnpore, up to 6th February, 1940, when he was relieved by Mr. N. D. Chaudhuri, who held charge of the division for the remainder of the year.

In addition to the staff enumerated above, one permanent Assistant Engineer, four temporary Assistant Engineers, two officiating Assistant Engineers, two unpaid Student Engineers, nine Overseers, nine temporary subordinates and the requisite number of computers, draftsmen and clerks were employed.

The Superintending Engineer, the Waterworks and Mechanical Engineer, and the Personal Assistant to Superintending Engineer, continued to serve on the Committee appointed by the Government to inquire into the whole problem of water supply in the United Provinces as its Chairman, member and Secretary, respectively.

The staff of the department has during the year rendered assistance to the Thomason Civil Engineering College, Roorkee, the Lucknow University and the Registrar, Departmental Examinations, Allahabad, as examiners and lecturers on engineering subjects.

The department has had a busy year and the staff on a good many occasions has worked overtime to keep abreast with the work. Several important works could not be undertaken due to funds not being available owing to the outbreak of War.

Orders of Government on the recommendation made by the Superintending Engineer for the confirmation of the temporary staff of the department are still awaited, and it is hoped that Government will arrive at a decision which will be to the satisfaction of the staff concerned.

ACTIVITIES OF LOCAL AUTHORITIES

Water supply maintenance—The Agra water supply still remains as unsatisfactory as ever. A scheme for the complete reorganization of the undertaking is under preparation but there is always the constant fear of a breakdown of the existing plant most of which is antiquated and patched up. To tide over the period until the reorganization of the whole undertaking can be completed, the Board has been advised to purchase either an additional spare steam engine or an electro-motor pumping unit but apart from obtaining quotations no action has been taken. This Board will have to face a serious breakdown if advice tendered by this department is not followed. During the year under review two mishaps have occurred: one when the supply from the river was so meagre that pumping had to be stopped until the Irrigation Department released water from the reserve reservoir at Kitham and on another occasion when the Electric Supply Company cut off the supply of power owing to a dispute with the Board concerning the accuracy of the electrical meters at the waterworks.

AGRA.

The staff arrangements still remain unsatisfactory and the condition of distribution is as last reported. The metering department, established a few years ago, has been abolished and what waste prevention measures are enforced are ineffective.

The percentage of tax collected is one of the lowest in the Province.

Detailed proposals for the reorganization of the water supply—The major portion of the scheme, comprising rising mains, supply and distribution mains, clear water reservoir, intake well, overhead tanks, etc., has been roughed out. The question of providing flocculators, mechanical clarifiers, prefilters and a suction dredger has been settled. The scheme has been approved by the writer and is at present being laid out in the office of the Executive Engineer, I Division, Public Health Department.

The scheme is estimated to cost approximately Rs.25 lakhs.

Drainage—The problem of Agra drainage is a perennial one. A comprehensive drainage scheme estimated to cost approximately Rs.50 lakhs was prepared by this department in 1917, but it never materialized on account of lack of funds.

When the town was visited by the late Hon'ble Minister for Local Self-Government, the residents of certain wards complained to her about the defective drainage of their mohallas and the insanitary condition of these areas, Government thereon issued orders that a modified drainage scheme to give some relief should be outlined.

In compliance with these orders the writer made an inspection of the town along with the Director of Public Health, Mr. Trivedi, Executive Engineer, Public Health Department and municipal officials on the 30th March, 1939, and later a forecast of cost amounting to Rs.10 lakhs for the 1st instalment of an underground drainage scheme for a portion of the town was submitted for the approval of Government.

Government *vide* G. O. no. 2328/XI—215, dated the 28th July, 1939, forwarded the above proposals to the Commissioner, Agra Division to take up the question of finance with the Board but no decision has yet been communicated.

Mental Hospital--Water supply Improvement-- A forecast of cost was prepared at the request of the Superintendent, Mental Hospital, for the construction of a 5 feet diameter masonry well 80 feet deep and installing therein a tube well of 5" diameter with a 7" Tej Patent Strainer.

ALLAHABAD.

Water supply maintenance-- For some years past this Board has been warned that the reserve of pumping plant is insufficient to provide against a breakdown. The Board has now asked this Department to proceed with the scheme for installing a 4th filtered water pump. Owing to the outbreak of war, delays are inevitable and it will probably be another two years before this unit is brought into commission. In the meantime it is important that the Board should proceed with other schemes for improvement and reorganization which have been recommended by the Waterworks and Mechanical Engineer.

Additional spare parts and waterworks materials should be purchased to tide over the war period but so far funds have not been provided.

During the year under review the Daraganj boosting pumping plant, consisting of an extremely old oil engine driving a centrifugal pump, completely broke down unfortunately in the middle of the hot weather. The Board had been warned for some years past that there was a likelihood of this plant breaking down, so if timely action had been taken the public would have been saved much inconvenience.

There is still much to be done in the matter of waste prevention. During the reconstruction of the Grand Trunk road which is being carried out by this department, the Executive Engineer of the II Division in conjunction with the Board's Waterworks Engineer took the opportunity of examining and testing house service pipes which were exposed and it was found that 40 per cent. were leaking badly and required renewal. Due to better control over the supply the Board has, on a good many occasions, been able to give a twenty-four hours continuous supply. A few standposts have been converted to the waste-not type as recommended by this department. These, when properly maintained, have proved successful.

The auxiliary tube well installations at Thornhill Road and Katra gave trouble due to the breakdown of the pumps and motors. The matter was taken up by this department with the manufacturers and the Board was advised to purchase genuine working parts from the pump makers and to overhaul the plant every six months and fit new parts as and when found necessary. This advice was not followed and parts manufactured in the waterworks workshop have, at times, been fitted; this has resulted in frequent breakdowns causing considerable inconvenience to the residents of these areas who obtain their water supply from this source. If the advice tendered by this department is followed, these installations should work satisfactorily in spite of the tube wells not being absolutely vertical.

Temporary water supply to the Municipal Board from Magh Mela Tube Well (Rs.1,970)—Due to the scarcity of water in Daraganj area, the Board requested this department to arrange for a supply of water from the Magh Mela tube well. This was given for 2 months for a period of 10 hours per day and an expenditure of Rs.1,912 was incurred on this account.

Magh Mela water supply (Rs.14,718)—The works were completed in time and maintained satisfactorily during the period of the mela by the department. A fire brigade engine was loaned by the Municipality as usual. Several outbreaks of

fire occurred but most were brought under control promptly. There were, however, complaints of low pressure at the tail end of the distribution system and an outbreak of a fire in this vicinity could not be controlled as effectively as in other places. An expenditure of Rs.14,341 was incurred on this supply.

Magh Mela water supply and maintenance of pumping plant (Rs.1,317)—The oil engine driven air lift-cum-centrifugal pumping plant in charge of the Well Boring Operations Division was thoroughly overhauled and some necessary spare parts were purchased. The second tube well which is kept in reserve for Kumbh and Adh Kumbh Melas was tested and it was found that there was no deterioration in the yield.

Magh Mela electrification (Rs.12,885)—Messrs. The Universal Engineering Co., Ltd., the contractors for the electrification, completed the work in time under the supervision of this department and satisfactorily maintained an uninterrupted supply during the mela period. The original 10 years' agreement with the United Provinces Electric Supply Co., Ltd., for the supply of the electric current, expired in 1939 and a new agreement on more favourable terms has been entered into for a further period of two years. An expenditure of Rs.12,162 was incurred during the year.

Tube well for Police Lines (Rs.1,615)—This was carried out at the request of the Inspector General of Police to increase the water supply from the existing well in the Police Lines. A 6" boring was taken down to a depth of 250 feet from ground surface and a 4" diameter tube well inserted. The yield on test was found to be 60 gallons per minute with a depression head of only about 4 feet. An expenditure of Rs.1,451 was incurred on the work during the year.

Tube well for the Allahabad University (Rs.2,250)—A forecast of cost was prepared at the request of the Registrar of the University for installing a 4" diameter tube well in the existing masonry well but the scheme was dropped as funds were not forthcoming.

Two tube wells in the University Hostel Compound (Rs.5,832)—A forecast of cost for constructing two tube wells was prepared at the request of the Warden, Macdonald Hindu Boarding House but the work has not proceeded for want of funds.

Installation of the fourth pump at Khusrubagh (Rs.71,642)—A scheme for this was submitted by the Executive Engineer, II Division, Public Health Department, Allahabad, and sanctioned by the writer and the Board of Public Health. The Municipal Board has applied to Government for a loan of Rs.71,000 to finance the work.

Municipal water supply—Second reorganization (Rs.13,20,000)—A forecast of cost for this prepared by the Executive Engineer, II Division, Public Health Department, has been submitted to the Municipal Board for their consideration.

Reconstruction of miles 498—500 of Grand Trunk Road with cement concrete—Sanitary portion—(Rs.1,36,654)—This work was started in July, 1939 and the laying of pipe sewers in the western section of road has been completed and also the laying of C. I. water mains. Considerable lengths of brick sewer have been constructed and a number of houses connected thereto. The work is in progress.

Drainage—During the year under review, proposals have been put up for the complete replacement of the drainage pumping plant and the adoption of modern methods of sewage purification and sludge digestion at the farm which should result in an effluent which will not pollute the Jumna river and prove more valuable and useful to the cultivators. The Board has not arrived at any decision.

For some years past the question of renewing the sewage pumping main which passes over the Jumna bridge has been under consideration by the Board. In June, 1939, the Municipality placed the order with a German firm for the supply of pipes but the outbreak of war prevented delivery and the Board is considering alternatives but has not arrived at a decision.

The Diesel engine driven pumping plant at the Sewage Pumping Station is extremely old, uneconomical and liable to breakdown any time and the Board would be well advised to be guided by previous recommendations and arrange for its replacement by modern plant. In the meantime precautions should be taken to avoid a breakdown by purchasing a full complement of spares.

Water supply (Rs.3,15,642)—The proposals will have to be held in abeyance until the end of the war when it is hoped prices of materials will revert to normal. AJODHYA

ALMORA.

Water supply maintenance—No improvements have been effected during the year and the water available is insufficient to meet the demands in the summer months. Revised water supply rules which provide for the metering of the municipal and private connexions have been adopted but there are no proposals for the imposition of a water tax and until revenue is raised by such means no radical improvement is possible.

The present supply is frequently polluted and no attempt has been made to follow advice as regards the prevention of waste at public standposts or to run regular night tests and take other steps prescribed by Government for preventing wastage.

Drainage—The Chairman, Municipal Board, has asked for the preparation of a detailed project and has deposited Rs 500 as departmental fees. The work will be taken in hand when the surveying and levelling is completed. The cost of improving the drainage of this old town will most likely amount to approximately Rs.3 lakhs.

BAHRAIGH.

Water supply—Here the supply which is limited to a few standposts is obtained from a tube well equipped with worn out pumping plant. A scheme for a new tube well equipped with modern plant, has been under consideration for some years but so far the Board has not taken any steps to proceed with the work.

Water supply maintenance *Repairs to pumping plant (Rs.1,282)* The old plant which is on its last legs has been patched up by the Executive Engineer, Well Boring Operations Division, with the hope that it will function until such time as the Board is able to finance the proposals for extension which were supplied in 1936.

Water supply improvement—Syed Salai Fair water supply (Rs.8,558) A grant for the construction of this well has been given by the Board of Public Health and the work has been completed by the Executive Engineer, Well Boring Operations Division, the results being particularly satisfactory, the well yielding 310 gallons per minute with only a depression head of about 9 feet.

BALLIA.

Drainage (Rs.1,38,081)—A forecast of cost for a drainage scheme, split up into useful working instalments prepared by the Executive Engineer, II Division, Public Health Department, Allahabad, and approved by the writer, has been forwarded to the Ballia Municipal Board for approval.

**BATESHWAR
FAIR (DISTRICT
AGRA).**

Water supply—A forecast of cost for improving the water supply to this important fair which is held at Bateshwar in Agra District every year was prepared by the Executive Engineer, I Division, Public Health Department, Meerut, at the request of the District Medical Officer of Health but no intimation has been received as to whether the Agra District Board has approved the proposals and arranged for financing same.

SENARES.

Water Supply Maintenance—On several occasions in the past the Municipal Board has been advised by the Waterworks and Mechanical Engineer to instal an additional filtered water pump to enable a continuous supply throughout the 24 hours to be given without undue waste of electrical energy. The Board so far has taken no action; it is doubtful if it will be possible to obtain a new unit for some years. The Board has, however, arranged to instal an additional unfiltered water pump, and the Waterworks Superintendent has manufactured this in his own workshop. A motor and electrical equipment is still required and due to the war it is feared that difficulty will be experienced in obtaining these within a reasonable period and the price is bound to be much above pre-war rates. At one time during the year under review it was feared that there would be an interruption in the supply due to mechanical trouble at the Electric Supply Company's works on which the waterworks depends for its power. Fortunately a mishap was averted. But very wisely the Waterworks Superintendent overhauled his steam plant so in the event of an emergency it could have been brought into use, but the supply to the town would have been much reduced.

On the outbreak of the war there was a shortage of chlorine and the difficulty was overcome by the Waterworks Superintendent erecting a temporary electrolytic chlorine producing apparatus. He received little assistance from the Board and had to make his own arrangements by obtaining on loan the necessary parts.

The water supply is still intermittent owing to the Board's apathy and refusal to follow the advice of this department and their own Waterworks Superintendent in regard to introducing and enforcing waste prevention measures. The Superintendent has done his best in the circumstances and has managed to increase the hours of supply from an average of 12.25 to 14.20 per day.

The waste problem has been tackled to some extent by the Waterworks Superintendent in spite of the Board's opposition. The Board will not allow the Superintendent to comply with the Government order relating to the carrying out of regular night tests and inspections. Much credit, however, is due to him for what he has done in spite of such opposition. He also deserves credit for inventing a new type of standpost from which water can be drawn only by rotating a cranked handle. This has proved quite successful in operation and the public has no objection to it. It has been recommended that this should be tried by other Municipal undertakings.

The Waterworks Superintendent's activities as regards the waterworks workshop and the fire brigade organization have continued unabated during the year and he is to be congratulated on the results. Improvements have been effected in spite of the lack of funds and encouragement from the Board.

Drainage—The Director of Public Health and the writer inspected the river front during January, 1940, and found that there was considerable pollution due to the escape of sewage from numerous outlets along the river front. The Municipality was addressed on the subject in this office no. 1552, dated the 16th February, 1940, but no reply has been received from the Chairman as to the steps that are being taken to prevent this nuisance.

It has been proved beyond doubt that the main system of drains if properly maintained will serve the major portion of the town. But this means systematic attention and desilting operations after the rains.

There is of course some sewage flow which cannot be intercepted by the existing drains but this could be dealt with separately by the construction of two or three automatic sewage pumping stations. There is, however, no doubt at all that the nuisance along the river front can be much abated if the existing drainage system is maintained as it should be.

The Board would be well advised to continue the policy initiated by Mr. Lynch, that is, to provide ample funds for the systematic maintenance of the sewers and also adequate supervision. It is very doubtful if the policy of preparing a complete set of record plans of the drainage system has been continued.

All existing and new drains connexions should be recorded on these plans and the testing of all existing house connexions which was taken up in the time of Mr. Lynch, if not completed, should continue.

The cost of constructing three or four small automatic pumping stations should not exceed pre-war prices, say roughly Rs.2½ lakhs. But these will not effect much improvement unless the existing drainage system is maintained in a proper fashion. This is really the crux of the problem.

Water supply—Trial well—An estimate for the construction of a masonry well 12 feet in diameter and 15 feet deep was sanctioned by the writer in October, 1939, and the Notified Area Committee has deposited a sum of Rs.2,300 with the Executive Engineer, Well Boring Operations Division, but Government has instructed that no expenditure has to be incurred until further orders are issued.

BHOWALI.

Water Supply Improvement (Rs. 34,144)—A scheme to serve a portion of the town in which the supply from wells is brackish has been prepared by the Executive Engineer, Well Boring Operations Division and accepted by the Board. The Board of Public Health has sanctioned a grant of Rs.17,072 to cover half the cost and the balance of funds has been provided by the Board out of a loan sanctioned by Government.

BRINDABAN.

Construction works in connexion with the distribution system were taken in hand in August, 1939, but orders for the pumping plant could not be placed until February, 1940, as the prices had increased considerably due to war and the question of meeting the additional cost could not be decided. The Board of Public Health have, however, come to the rescue and sanctioned an additional grant of Rs.10,000 to meet the extra cost. An expenditure of Rs.10,860 has been incurred during the year.

Drainage—The Chairman, Municipal Board, has asked for a forecast of cost for improving the drainage which at present is in a deplorable condition. The town has been inspected and it appears that the river frontage should first be dealt with. Necessary surveying and levelling has been carried out and the forecast of cost has been completed in rough.

Jumna river training—The Chairman, Municipal Board, also asked for a forecast of cost for training the river Jumna back to the Ghats. The necessary reconnaissance was made by Executive Engineer, I Division, and the proposals discussed at site. It was suggested to the Chairman that the Irrigation Department should be consulted in the matter and the Chairman thereupon referred the matter to the Irrigation Department.

A public spirited citizen Rai Bahadur Ramji Das Bajoria promised a donation of Rs.3 lakhs for the training of the river under certain conditions and the matter came up for discussion at a meeting of the Board of Public Health held on 30th January, 1940, at which it was decided that no guarantee could be given that the training works would result in effecting a permanent flow of river water along the ghats. The Board, however, was prepared to give a grant of Rs.5,000 to cover the cost of the preliminary investigations proposed by Mr. Gerald Lacey, Superintending Engineer, III Circle, Irrigation Works, United Provinces, provided Rai Bahadur Ramji Das Bajoria deposited Rs 3 lakhs to the credit of Government or alternatively gave an assurance to the satisfaction of Government that the amount will be forthcoming in full if the experts after investigation reported that it could reasonably be expected that a permanent flow of river water along the ghats could be maintained during the winter months. The Municipal Board also should give an assurance that the recurring expenses involved in the proper maintenance of the works after completion would be met.

The Board of Public Health's decision was communicated to the Municipal Board, Brindaban, for information but no further communication has been received.

CAWNPORE.

Water supply maintenance—The reorganization scheme which is being undertaken by a firm of consulting engineers, Messrs. Williams Temple and Bartholomew, has progressed somewhat slowly. The Engineers complain of delays and indecisions on the part of the Board. Trouble has ensued over the placing of certain contracts and the matter received much publicity in the press.

The new unfiltered pumping station buildings at Bhaironghat have been completed and are ready for the installation of the pumping plant. Dredging operations which were undertaken for opening a channel from the main stream of the river to the intake have, according to report, proved successful.

A chlorinating apparatus, the purchase of which was recommended some years past, has been installed. Most of the work included in the scheme of the reorganization of the distribution has been completed and many of the zone pumping stations and reservoirs have been constructed. The war has delayed the delivery of pumping and other plant and the Board has yet to arrive at decisions upon several essential matters, and orders cannot be placed until this is done. This work should have been completed by the end of 1940, but the war has delayed matters and it is doubtful if the scheme will be functioning until sometime in 1941.

This Board continues to ignore recommendations relating to the appointment of an Assistant Waterworks Superintendent and other staff, which will be required in the near future as soon as the reorganization scheme is in operation. The Waterworks Superintendent is almost due to retire and it is most necessary that a fully trained, experienced and competent engineer should be appointed in his place.

Water supply improvement—Two trial bores at Bhaironghat (Rs.400)—This work was undertaken at the request of Messrs. Williams Temple and Bartholomew, Consulting Engineers for Cawnpore Water Supply Reorganization at the suggestion of the writer for the purpose of ascertaining the nature of underground strata at the site of the proposed pumping station. It was completed in September, 1939.

Drainage—The Permatghat Sewage Pumping Station has continued to function satisfactorily but it is feared that the pumps, although of the most robust design, will not stand up for long against the severe conditions they operate against. The sewers are dumping grounds for all kinds of rubbish and the manufacturers are also to blame for the manner in which they utilize the public sewers for the disposal of trade effluent and other offensive waste. This problem should be tackled by the Board, for at present no control is exercised over the persons responsible for the nuisance.

Owing to the outbreak of war, Messrs. Turner Hoare & Co. have not yet been able to complete their contract and to renew parts of the slung type storm-water pump which were severely damaged by the extraneous matter in the sewage during the maintenance period. Certain changes were proposed in the arrangement but the war has delayed matters as the manufacturers of the pump are controlled by a Swiss Company, which is unable to come to their assistance in the present circumstances.

The discharge from the Permatghat Pumping Station into the main intercepting sewer together with the normal sewage flow is such as to cause a surcharge which results in overflows at various points. The whole question of the main drainage at Cawnpore requires thorough investigation and reorganization. The Improvement Trust and the Municipal Board have been advised to prepare a joint scheme to overcome some of the difficulties, which both authorities are faced with.

Reorganization of the Permatghat Sewage Pumping Station (Rs.1,55,135)—The plant comprising transformers, H.T. and L.T. switchgears, two 1,500 gallons per minute motor driven vertical spindle pumps, flume recorders and accessories have been erected at site, tested and handed over to the Municipal Board, Cawnpore.

The Slung Type Pump of 3,000 gallons per minute capacity has operated under extreme conditions and requires some modification which the contractors have been asked to carry out.

All works in connexion with the rising main, pump house and transformer room were completed last year with the exception of fitting a 24" sluice valve to the inlet of the sump well. This could not be done on account of the slung type pump which was required to dewater the tank sewer during the operation being out of commission.

Cleaning of wells—Kalyanpur Criminal Tribes Settlement (Rs.450)—A forecast of cost amounting to Rs.450 for cleaning and repairing the six existing wells in the settlement was prepared by the Executive Engineer, Well Boring Operations Division, Cawnpore, and sent to the Manager but the scheme has not proceeded for want of funds.

Water supply maintenance—The new Waterworks undertaking at Dehra Dun DEHRA DUN. has been successfully managed during the year under review. Demands for water have increased and the accounts for the year ending the 31st of March, 1940, show that the undertaking is self-supporting. During the summer months the supply from the Bandal source has had to be increased from 1 to 1½ cusecs to meet the demand and the filters at times have been overloaded. The capacity of the underground storage reservoir should be increased as it is insufficient to meet the peak demand and the Board has been recommended to take steps to extend the filters and reservoir in anticipation of an increased demand in the near future. So far, however, no action has been taken. The Waterworks Superintendent is to be congratulated on his keenness he has displayed in investigating and detecting leaks in the Bandal Pipeline. The Superintendent is ingenious and industrious and deserves the full support of the Board. As the undertaking develops he will require additional help to relieve him of some of his responsibilities which are becoming more and more onerous as the number of connexions increases.

Water supply reorganization and extension of distribution system (Rs. 3,47,532)—The project amounting to Rs. 2,72,274 was prepared in 1937 and work was taken in hand on the 5th January, 1938. During construction the Board considered it necessary to provide pipe lines in some more thickly populated districts, which, to keep the cost low, were left out of the original project. A further loan of Rs.48,000 was obtained from the Government in January, 1939 for the purpose and a grant of Rs.5,508 secured from the Board of Public Health in March, 1939. The revised project amounting to Rs.3,47,532 received technical sanction in December, 1939. The whole of the work including residential quarters at the waterworks is nearly completed except some work on the staff quarters and four chambers for housing the waste detecting meters which will be completed shortly.

The total expenditure to the end of March, 1940, amounted to Rs.3,08,226.

Drainage—At the suggestion of this department, the Board agreed to take steps to improve the western portion of the town, which is in a very filthy condition. Consequently a project was prepared for improving the drainage of

Khumbura and Khadim areas. The estimate amounted to Rs. 49,356 and was supplied to the Municipal Board in July, 1939, who have applied for a loan of Rs 50,000 to finance the work. The project has been technically approved. The administrative sanction has also been given by the Board of Public Health. The work will be carried out by the Municipal Board through their own agency.

DEWA

Water supply improvement—Extension of pipe line (Rs 7,593)—The work comprising the extension of the pipe line from the Fair and Exhibition grounds to Durgah and the provision of tank standposts for a water supply to pilgrims, was completed and handed over to the Secretary, Dewa Fair and Exhibition Association during the year. An expenditure of Rs 6,398 has been incurred.

ETAWAH

Water supply improvement (Rs 174,712)—A comprehensive scheme for a water supply to this town was sanctioned in August, 1938. As the supply will be taken from tube wells a decision to proceed with the work cannot be arrived at until the yield from a trial well has been ascertained. A well is under construction and an expenditure of Rs 2,045 has been incurred on this during the year.

**FATEHPUR
SIKRI**

Water supply maintenance—This small water supply has been a bleb since to the populace of the Notified Area and to visitors. The committee managing the undertaking has been repeatedly advised to duplicate the pumping plant but action has been postponed on account of financial stringencies. The Notified Area has however now applied to Government for the necessary loan funds.

The staff arrangements are still unsatisfactory and during the year under review no improvement can be recorded.

FATEHGARH.

Water supply improvement Fatehgarh Central Jail—A forecast of cost amounting to Rs 1,500 was prepared at the request of the Superintendent Central Prison, for augmenting the water supply of the jail but the scheme has not yet materialised.

FYZABAD.

Water supply maintenance—The most important recommendation relating to the Fyzabad waterworks undertaking is that the whole system should be extended in accordance with the scheme already prepared. All connexions should be metered and supplies to standposts controlled by waste-not devices. Only by the Board adopting this advice can the undertaking be put on a sound financial basis. The Board, however, does not view the matter in this light and continue to advance the plea that lack of funds do not admit of any improvements or developments.

This Board has not taken any steps to proceed with the Ajodhya Water Supply Scheme in spite of the fact that each year considerable sums are realized by way of pilgrim tax from visitors who come from all parts of India.

The Waterworks Superintendent in spite of many difficulties has maintained the mechanical plant in good condition and is doing his best to tackle the waste problem by carrying out numerous inspections and tests.

Negotiations have continued between this department and the Hydro Electric Department regarding a bulk supply of electric current for driving the pumps but so far sufficiently attractive rates have not been offered to justify the change over.

Water supply improvements—A tube well near the existing tube well no. 3 (Rs 26,772)—The work was completed last year and handed over to the Municipal Board.

Additional tube well for augmenting the water supply (Rs. 11,937)—An estimate amounting to Rs. 11,937 was sanctioned in June, 1939, but the work has not been taken in hand for want of funds.

GHAZIPUR.

Water supply maintenance—The supply is dependent on one tube well and a single oil engine driven pump. The Board has not taken any steps to follow the advice of the department to sink another tube well and duplicate the pumping plant.

The water supply rules originally proposed have been rejected by the Board and even the revised rules framed by the Board themselves have not yet been enforced. Nevertheless, numerous unmetered and uncontrolled connexions have been given to consumers in return for lump sum payments. The collections have been extremely bad during the year under review, only 60 per cent. of the total demand having been collected. The Board is most recalcitrant. Government

orders are not complied with, contractors' bills are left unpaid for months and the advice tendered by technical officers of this department is ignored. The most ordinary requirements of the Waterworks Superintendent for maintaining the plant are not met and it is difficult to see how the waterworks can function for long under present conditions and a breakdown seems inevitable. The Board was advised, due to the war emergency, to purchase a reasonable complement of spare parts and stores but so far the advice has been ignored.

The waterworks distribution system has been considerably extended with a hope of bringing in more revenue but the Board have been warned that demand will soon exceed the supply unless general metering or some form of control is adopted.

Ghazipur water supply—II instalment (Rs.3,06,588).—A scheme estimated to cost Rs.36,641 for the extension of the distribution system was taken in hand last year. The Chairman, Municipal Board, later, asked the Executive Engineer, II Division to carry out a further extension to the extent of 12,000 ft. and the work has been taken in hand. An expenditure of Rs.44,124 has been incurred during the year.

Installation of chlorinating plant (Rs.6,045).—A forecast of cost for this has been supplied to the Board but it is not proposed to take any action until the end of the war.

Water supply maintenance.—The plant broke down completely during the year. The authorities responsible for the supply have been warned for many years past that the oil engines and pumps on which the supply is dependent were worn out but no action was taken until the actual breakdown occurred, after which the Board found a small sum for emergency repairs. The plant, however, cannot continue for long and another breakdown is inevitable sooner or later. A scheme has been prepared by this department for the renewal of the pumping plant and the construction of a new tube well; and a grant of Rs.10,000 has been promised by the Board of Public Health provided the remaining sum of Rs.45,000 is taken as a loan. The District Board, however, refuse to levy a water tax or to take any steps to raise revenue and it is doubtful if such a scheme will ever be undertaken. It is therefore probable that the waterworks will shortly have to close down.

GOLA GOKARAN
NATH.

Water supply improvement—Repairs to pumping plant (Rs.325).—An estimate for this was prepared by the Executive Engineer, Well Boring Operations Division, Cawnpore, and the work is in hand.

Water supply—Second tube well (Rs.43,300).—A forecast of cost for a second tube well with pumping plant has been furnished to the President of the Committee for acceptance.

Water supply maintenance.—An estimate for a trial tube well, amounting to Rs.8,162 prepared by the Well Boring Operations Division, was sanctioned by the Board of Public Health in February, 1940, but as the cost of the work is bound to increase due to rise in the prices consequent on the war, the Board of Public Health has sanctioned a grant of Rs.10,000 for the purpose and this has been placed at the disposal of the Well Boring Operations Division. Tenders for the work will be invited shortly.

GORAKHPUR.

Drainage extension—II instalment—Construction of retaining wall (Rs.32,834).—A project was prepared last year for the reconstruction of a portion of retaining wall that was damaged during the rains of 1938. It has been administratively sanctioned by the Board of Public Health who have also given a grant of Rs.14,870 towards the cost. The work will be taken up early next year.

Water supply maintenance.—In accordance with the advice repeatedly given by this department for many years past the Notified Area Committee has at last applied to Government for a loan to undertake a scheme for filtering and chlorinating the contaminated spring water which is the only source of supply. Water supply rules have been revised by the Committee but it is feared no appreciable increase in income will result. The supply is limited and the Committee has been advised to make the best use of it by imposing a water tax and metering all private connexions. No action has been taken on this recommendation and there is ample evidence that much waste of water is taking place at public standposts and elsewhere.

HALDWANI.

HAPUR.

Improvement to the drainage (Rs.47,800)—A forecast of cost for a partial drainage scheme amounting to Rs.47,800 prepared by the Executive Engineer, I Division, Public Health Department Meerut, has been supplied to the Chairman Municipal Board, for approval. But from the reply received it appears that the Board have not yet come to any decision.

HARDWAR.

Water supply maintenance—The yield from the old Tibri wells has considerably decreased during the current year and the major portion of the supply has now to be obtained from the fourth tube well installation which was completed a few years ago. At the outbreak of the war, the Board was advised to safeguard the supply by purchasing a reasonable complement of spares and stores, the total cost of which, it was estimated would amount to about Rs.50,000. The Board, however, decided not to take any action and refused to apply to Government for financial assistance in the form of a short term loan, as recommended.

Since the inception of the main drainage system and the provision of numerous water-flushed latrines and pail-depots, the water consumption has increased from 19 gallons to 33 gallons per head per day. The Board refuse to act on advice relating to the metering of private connexions and has done little towards preventing waste at public standposts, although the staff and the Executive Officer have done their best to control private supplies to some extent by throttling the consumers' service pipes. A profit continues to be realized on the waterworks yet the Board complain of financial stringency and their inability to carry out schemes of improvement. It appears that the waterworks undertaking is not being managed in a business-like manner.

Electrical undertaking.—In accordance with Government orders the Water works and Mechanical Engineer regularly inspects this municipal undertaking. The recent reports disclose a most inefficient and unsatisfactory state of affairs. Demands for electricity cannot be met owing to the overloaded condition of the installation.

Voltage is below the limits prescribed by the Indian Electricity Act and the distribution system and sub-stations are generally badly maintained. The Board refuse to take action on the grounds of financial stringency in spite of the profits they realize. Financial losses in an electrical undertaking of this kind can only be due to inefficient management and it is probable that unless some prompt steps are taken in the near future to manage the undertaking in conformity with the rules prescribed under the Indian Electricity Act, Government may find it necessary to revoke the licence.

Water supply improvement—New tube well at Mayapur (Rs.12,600)—A forecast of cost amounting to Rs.12,600 has been prepared at the request of the Chairman, Municipal Board, Hardwar, for augmenting the existing supply. The Municipal Board applied to the Board of Public Health for a grant-in-aid towards the cost and Rs.12,000 was promised at a meeting held on 30th January, 1940, on condition that the Municipality took steps to have detailed proposals prepared and obtained the administrative sanction of the Board of Public Health thereto.

Testing the yield of a well in Chowk (Rs.5,832)—A forecast of cost amounting to Rs.5,832 was prepared at the request of the Executive Engineer, I Division, Public Health Department, Meerut, to ascertain if the existing well would give sufficient yield for a supply to Jwalapur but nothing has materialised for want of funds.

Improvement to Har-ki-Pairi (Rs.2,24,500)—The main portion of the work was completed and handed over to the Municipal Board in 1938. Some minor works during the year have been carried out in connexion with the Clock Tower, and some steps to the Island platform about 250 feet in length have been lined with stone. The total expenditure up to the end of March, 1940, is Rs.2,18,388.

Diversion of Bhimgoda Road.—The Improvement Committee contemplated diverting the Bhimgoda Road and desired the opinion of this department. The site was surveyed by Executive Engineer, I Division and a rough idea of the cost was given to the Advisory Committee after referring the matter to the Railway authorities who stated that they would have no objection to the scheme provided the road is taken at least 100 feet away from their tunnel.

Drainage (Rs.6,19,453)—This work was taken in hand in September, 1936, and with the exception of some minor works for which the Board could not come to any final decision, was completed well ahead of time and functioned before the last Kumbh fair.

The underground and surface drainage works, are working satisfactorily and so is the pumping plant. Maintenance, however, could be improved.

The contract of Messrs. Jessop and Co., Calcutta, for the pumping plant has not yet been closed as one or two minor matters pointed out by the Waterworks and Mechanical Engineer have still to be attended to.

Tenders for some additional works, which were left over, have been invited and the work will be taken in hand as soon as a tender is accepted.

Sewage Farm—The farm is about 53.36 acres in area. Compensation for the land acquired has not yet been paid, as, according to recent orders of Government, the land is to be restored to the original tenants. At present the farm area is let to two tenants. Two portions measuring 12 bighas and 230 bighas have been leased for three years for Rs.180 and Rs.3,600 respectively and the third portion which measures about 18 bighas is being managed by this department. For the time being the I Division is supervising the maintenance of the farm on behalf of the Board.

The total expenditure on the work to end of March, 1940, amounted to Rs.5,05,016 including Rs.2,890 for sewage farm.

Drainage of Bhimgoda beyond Har-ki-Pairi (Rs.80,000)—The existing drains in this area at present discharge into the Ganges above Har-ki-Pairi and pollute the sacred pool. The main purpose of drainage scheme, already completed, cannot therefore be fulfilled, if this pollution is not prevented. The Board in October, 1939, deposited the fees for the preparation of a scheme for this area. The site has been surveyed and detailed estimates are under preparation. The proposals provided for pumping the sewage into the existing main sewer near Har-ki-Pairi.

Training of Lalla Rao, Hardwar (Rs.58,000)—A forecast of cost for this has been supplied to the Chairman, Municipal Board, by the Executive Engineer, I Division, and it is understood that a scheme will be drawn up when finances permit of the work being taken up.

Staff—Considerable trouble ensued over the appointment of an Assistant Electrical and Waterworks Engineer. The advice of this department was rejected and a relation of a member of the Board appointed, but after serving for about a year his services were dispensed with by the Chairman. Since then matters in regard to the Board have gone from bad to worse. There have been votes of no-confidence and many intrigues and counter-intrigues have taken place with the result that the administration has practically ceased to function.

Water supply maintenance—Since the last report, an ammoniating and chlorinating plant has been installed for sterilising the supply and now the bacteriological results are satisfactory. All private connexions in Hathras are metered and the supply is continuous throughout the 24 hours. Waste is very little and the whole undertaking can be considered as successful. The Board complain of financial stringency because on the year there is a deficit of Rs.20,500. But the chief reason for this is that the Board instead of paying the originally arranged sum of Rs.8,930 per annum for interest and sinking fund charges, insist on paying an amount of Rs.25,154. Also, the water tax imposed is much less than what it should be, being only 2½ per cent. which is the lowest water tax in the Province. If the undertaking was managed on proper lines and reasonable taxation imposed it would be profitable and schemes of extension and development which have been recommended by the department could be carried out without any financial embarrassment to the Board or without charging excessive rates for water supplied to the public. Immediate requirements include a small workshop and a stock of spares.

HATHRAS.

The staff salaries are much too low and the Superintendent who has been responsible for the undertaking since its inauguration has resigned, having obtained a better appointment. So far the Board has not followed the advice of the department in fixing a reasonable grade for the vacant post and has advertised the appointment at a salary which will not attract the services of a first class man.

The dispute with the Electric Supply Company concerning low voltage and the provision of an H. T. main and a waterworks sub-station continues, but Government have ordered the liquidators of the Supply Company to provide what was originally agreed upon, and it is hoped that in consequence conditions will be improved.

Water supply improvement—Providing chlorinating plant (Rs.13,047)—The chlorinating and ammoniating plant, after test was handed over to the Municipal Board in February last and is working satisfactorily. The electric installation of the chlorinome house has been completed and final payment made. Total expenditure to end of March, 1940, amounted to Rs.11,744.

Drainage (Rs.3,10,692)—The Chairman, Municipal Board, was requested to deposit the departmental fees for the preparation of a detailed project but his reply was that the amount would be deposited when the loan already taken for the waterworks is fully repaid and consequently the preparation of the scheme could not be taken in hand. The Board has now resolved to make a provision for the requisite amount to cover the preparation fees in the revised budget for the year 1940-41.

Improvement to the pucca tank—The Chairman wishes provision to be made in the drainage scheme for the interception of the sullage now finding its way into this tank. He has been informed by the Executive Engineer, I Division, that this is possible and it will be provided for in the fair project but this addition will appreciably add to the cost.

JAUNPUR.

Water supply maintenance.—This undertaking, which was first inaugurated in the year 1937, continues to operate satisfactorily. All connexions are metered and waste is kept within reasonable bounds but it could be reduced still further if the recommendations of this department relating to the use of special waste-not devices were adopted.

A continuous supply of 24 hours is given to private connexions, but the supply at standposts is given only for a limited number of hours. This arrangement seems to work satisfactorily and tends to reduce unnecessary consumption at the standposts.

The Board has taken steps to obtain a reasonable stock of spare parts and stores to meet the present war emergency and as recommended have applied to Government for a short-term loan.

There have been troubles with the staff during the year. Strikes have been threatened and there have been cases of indiscipline. The staff is not over paid and the working hours are long. The Board has been advised to appoint additional hands but has taken no action.

Water Supply Improvement (Rs.4,728)—A forecast of cost for providing another balancing tank similar to the existing one below the second settling tank has been supplied to the Board by the Executive Engineer, II Division.

Drainage Improvement (Rs. 42,161)—The scheme which was prepared last year by the Executive Engineer, II Division, has been sanctioned by the Board of Public Health who have promised a grant of Rs.30,000 towards the cost if the Municipal Board will provide the balance. The preparation of the tender forms and specifications is in hand.

JHANSI.

Water supply maintenance—A scheme is being prepared by the Executive Engineer II Division for replacing the extremely old and inefficient pumping plant, and it is hoped that there will be no delays in proceeding with the work as it is most urgent, the present plant on which the supply is dependant being likely to break down any time.

Nothing has yet been done to instal filters and the quality of the water supplied leaves much to be desired. The supply to the city is treated with alum and chlorinated but this is not sufficient and purification by filtration is essential. At one time the Board could not obtain supplies of chlorine and alum due to delay in placing orders.

During the hot weather of 1939 the Pahuj reservoir from which the supply is taken was depleted to such an extent that the plant was damaged by having to deal with bajri and other solid matter drawn into the pumps. The scheme for the new pumping plant and filters includes a new intake to overcome this defect.

The undertaking is self-supporting and could be made more profitable if the advice of the Public Health Engineering Department regarding waste prevention was followed. The supply does not fully meet the demand, for a portion of the town is not supplied. There are frequent complaints regarding shortage of water and in view of the bad quality of the water supplied, the undertaking cannot, in any way, be considered satisfactory.

The Board has applied for a short-term loan for the purchase of additional spare parts and stores consequent on the war.

Water supply reorganization (Rs.3,48,165)—A scheme for the complete reorganization of the supply has been prepared by the Executive Engineer, II Division, Public Health Department, and approved by the writer. The project has been sent to the Municipal Board for their approval and to arrange finance.

Construction of Civil Lines service reservoir (Rs.54,406)—This scheme was to be financed half by loan and half by grant. The Board of Public Health sanctioned a grant of Rs.27,203 but as Government could not guarantee that a loan of Rs.27,203 would be made available the work could not be taken up during the year under review.

Drainage—The town was inspected at the request of the Board to ascertain if any useful purpose would be served by revising the forecast of cost for drainage improvements prepared in 1926-7. The Board was advised that there was no object in revising the old proposals and that a fair scheme should be drawn up. The Board, however, decided not to proceed until the loan, that they have already taken from Government, is liquidated. KHURJA.

Water supply maintenance—The demands of the public cannot be met by the existing tube well and the oil engine driven pump which is not in duplicate and the supply conditions cannot be considered satisfactory. For some years past the Notified Area Committee has been advised to meet the situation by providing an additional tube well and duplicate plant which along with a service reservoir of greater capacity would enable the demand to be met. However, no action has been taken. The water supply was interrupted for some time during the year owing to a breakdown of the oil engine which is now antiquated and unreliable. KOSI.

The Committee has applied to Government for a short-term loan to provide a stock of spares and waterworks stores, during the war period. But it was considered that the funds could be better utilized by providing a complete standby pumping plant and the Committee was advised accordingly, but so far has not followed the advice.

The Waterworks Superintendent is to be congratulated on the way he manages to maintain a 24 hours continuous supply and the manner in which he controls wastage, as night tests disclose that there is practically no leakage or excessive consumption.

Staff arrangements are most unsatisfactory. Most of the employees are called upon to work overtime for which they do not receive extra payment and no quarters are provided for them at the pumping station which to some extent would alleviate the situation.

The Committee has been advised to improve matters but has taken no action. A report on the conditions has been sent to Government through the Board of Public Health.

Water supply—The fair project for the above work, prepared by the Executive Engineer, I Division, has been administratively approved by the Board of Public Health and technically sanctioned by the writer. KOTDWARA.

The preparation of the tender forms and specifications will be taken in hand as soon as the Deputy Commissioner, Garhwal, incharge of Kotdwara water supply has made arrangements for the balance of funds required.

Water supply maintenance—Lucknow continues to extend in all directions but the Board is slow in taking steps to improve and extend the waterworks distribution to meet future requirements. Consumption is unduly high, waste is prolific and much leakage from service pipes and underground mains is suspected, but in spite of a large detection staff the problem is not tackled as it should be. Government orders relating to regular night tests and waste-not measures are largely ignored, no tests having been run from December, 1938 to February, 1940. LUCKNOW.

Some waterworks improvements have been effected by the provision of a new service reservoir and filters and during the year tenders have been invited for an additional filtered water pumping unit which is urgently required. The consulting engineers have also been instructed to prepare further schemes of capital works and it is hoped these will be proceeded with promptly.

This Board continues to complain of financial stringency and their inability to carry out any development. This must largely be due to faulty direction, for every well managed water undertaking, in the world of this size, if properly managed, has no difficulty in providing from revenue sufficient funds to maintain the works in first class order and also a surplus for plant replacements, developments and all other necessities, without imposing an undue burden upon the rate payers in the form of water tax or other charges. Many matters require attention in connexion with this undertaking and until these are tackled in a business like way, there can be little real improvement and public funds will continue to be wasted.

At the beginning of the war it was estimated that funds to the extent of about one lakh of rupees would be required for the purchase of essential spare parts and waterworks stores to provide against an anticipated shortage of material due to the outbreak of war but a loan as yet has not been applied for.

The largest pumping unit at Gaughat which has been working for about six years has begun to show signs of excessive wear and the Board, anticipating a breakdown have placed an order for a new casing and other parts. The pump has given good service and the defects are due to the turbid and silt laden river water which it is called upon to deal with.

The results of the bacteriological analyses of water from the slow sand filters continue to be the worst and the Superintendent has been unable to discover the cause. The matter requires careful investigation.

The Board for many years past has been advised to appoint an Assistant Waterworks Superintendent but the advice is persistently ignored. And difficulties always arise about officiating arrangements when the Waterworks Superintendent takes leave.

Jail Training School water supply and sanitary works (Rs.15,817)—An estimate for this has been furnished to the Public Works Department.

Drainage pumping station—The pumping units are completely worn out. They are also uneconomical and unsuitable for dealing with crude sewage. Complete reorganization and renewal of the plant is necessary. The Board is aware of the position but so far has not taken any action except to purchase a new pump which has enabled the station to continue to function. The consumption of electricity is excessive and great economy in running would result if the plant was replaced.

Ghaziuddin Hyder Canal Sewer and Lining (Rs.7,739)—The maintenance of these works, constructed as an anti-malaria measure, was carried out departmentally during the year under report.

Repairs to breach and replacement of a portion of the western intercepting sewer (Rs.19,942)—This work was taken in hand by the Executive Engineer, II Division, P.H.D., Allahabad, and satisfactorily completed during the year in spite of many difficulties encountered due to the work being under sub-soil water level and close to the Gomti Bund. The contractors were Messrs. Noor-ullah Ghazanfarullah of Allahabad.

Maintenance of Gomti Weir (Rs.3,505)—The weir was maintained satisfactorily throughout the year and necessary repairs were carried out.

District Public Works Department Works Trial bores (Rs.378)—An estimate for this was supplied to the Public Works Department for the purpose of ascertaining the nature of the strata on which it was proposed to found a bridge at mile 18 of Lucknow-Cawnpore Road. One bore was taken to a depth of 65 feet below the bed of the nadi and was completed but the second bore was not undertaken as desired by the Executive Engineer, Provincial Division.

MEERUT.

Water supply maintenance—The Commissioner has again pointed out to the Board that the condition of the old water turbine driven plant is such that it should be replaced by modern and up-to-date plant. It is essential to have a scheme prepared and to make arrangements for standby plant as soon as possible, for at the earliest it will be 3 or 4 years before the new plant can be set to work.

A 24 hours continuous supply is maintained, but the Board does not follow the advice relating to metering connexions, extensions of water supply system, waste prevention measures and other matters. Advice also relating to the staff

matters is ignored. Several schemes have been prepared by the Public Health Engineering Department at the request of the Board for improving the water supply in high level areas, and for extending the distribution system to areas which are not now served, but no action has been taken and all the schemes, upon which much time has been spent and expenditure incurred, have been dropped.

Improvement to High Zone water supply (Rs.1,31,000)—A forecast of cost embodying proposals for a water supply to the High Zone was prepared by the Executive Engineer, I Division, Public Health Department, Meerut, approved by the writer and submitted to the Board for approval which is still awaited.

New Mandi—The matter was discussed by the Executive Engineer, I Division, Public Health Department, Meerut, with the Chairman, Municipal Board, in January last and a rough idea of the cost given to him. Instructions from the Chairman for the preparation of a detailed project are awaited.

Water supply maintenance—The maintenance of water supply remains as unsatisfactory as ever and a further deterioration in the works has taken place since the last report. The water supply is unfiltered and is polluted and is therefore dangerous to health. Waste is prolific and no water tax is imposed. The undertaking is profitable and could be made much more so under efficient management, yet the Board complain of financial stringency and state that they are unable to finance any improvement schemes. MIRZAPUR.

Water supply (Rs.36,828)—Tenders for the laying of pipes and construction of buildings were duly invited and the work was taken in hand in September, 1939. MOGHAL SARAI.

Tenders for the machinery are also being invited and the works are expected to be completed by the end of the next financial year.

Water supply installation of chlorination plant (Rs.5,319)—A scheme for the chlorination of the water supply has been prepared by the Executive Engineer, II Division, Public Health Department, Allahabad, and sanctioned by the writer and also by the Board of Public Health and this item has been included in the contract for the installation of the pumping plant for which tenders have been invited.

Improvements to drainage and sewage farm (Rs.90,000)—The Chairman, Municipal Board, has asked for the preparation of a detailed project and deposited Rs.2,091 as the departmental fees. Necessary surveying and levelling was carried out and the project has been prepared in rough. The fairing out of the project could not be completed during the year due to other urgent works in hand. MORADABAD

Water supply maintenance—In spite of difficulties the supply has been satisfactorily maintained throughout the year under report. MUSSOORIE.

Waste has been controlled and reduced considerably by an efficient pipe line staff. Many schemes for improving the supply and augmenting the plant have been rejected by the Board.

There has been an alarming shortage of water due to a succession of dry years which has resulted in some of the springs drying up and the Board have taken no steps to deal with the situation. Road watering has had to be restricted during the hot weather months at certain places and in some areas there has been a shortage of water for domestic use also.

Hydro-electric undertaking—Water shortage from the spring sources has also affected the Hydro-electric works and the standby Diesel at Dehra Dun has had to be extensively used. The undertaking continues to be successful financially and is a great asset to Mussoorie. Many improvements, however, could be effected if the advice of the Board's Electrical Engineer and technical officers of this department was followed by the Board.

Water supply maintenance—One of the defects in the water supply of this town is that the supply is intermittent and consequently there is considerable wastage and misuse of water. Advice relating to the provision of special waste preventing devices at public standposts has not been followed. The Board, however, intends proceeding with the scheme of reorganization and extension which has been prepared by this department. Delays, however, are inevitable due to the war and it is doubtful if they will be completed within the next 2 years. MUTTRA.

During the year under review there has been some difficulty due to the reported pollution of the supply which is obtained from tube wells. Steps have been taken to discover the cause and some improvement has already been effected. It is necessary, however, to safeguard the public against possible future contamination by installing a chlorinating plant which should always be available for sterilization of the supply. A scheme for this has been prepared but has not yet been accepted by the Board.

The Board has been advised to obtain a short-term loan for the purpose of purchasing spares and additional stores to meet the war situation but has taken no action so far.

Water supply reorganization—The fair project has been administratively approved by the Board of Public Health. A loan application for Rs.3,67,171 has been submitted to Government and the first instalment of Rs.50,000 has been sanctioned.

The tender forms for all the six contracts as detailed below have been prepared.

Tube well no. VI (Rs.9,159)—This work is included in the main project for water supply reorganization (as contract no. 5). The contract has been placed with Messrs. Sarup & Bansi Lal of Lahore, and the work is in progress. Boring has been carried down to a depth of 219 feet and the manufacture of strainers and pipes is in hand. An expenditure of Rs.1,452 has been incurred during the year.

Proposed water supply arrangements for Dibleenagar (Rs.8,202)—Due to the 32nd session of the United Provinces Political Conference, being held at Muttra in November last, a seventh contract for the above work was drawn up as an emergency measure. Tenders were invited in October, 1939, and work started. Most of the work was completed in about a month's time in spite of many difficulties in arranging for the materials due to war. Most of the work was completed before the actual session of the Conference commenced and the water supply was available in time and was maintained satisfactorily throughout the session.

Provision of chlorinating plant—The analyses results from all the wells having been unsatisfactory since July, 1939, investigations were made on site by officers of this department and as a precautionary measure sterilization of the entire supply has been recommended.

An estimate for a suitable plant, which will comprise of a chlorinator and ammoniator, has been prepared by the Executive Engineer, I Division, Public Health Department, Meerut.

Drainage pumping station—Most of the plant at the Drainage Pumping Station is worn out and requires replacing. No definite steps have been taken by the Board to deal with the situation but a scheme has been prepared for installing two small additional electrically driven sewage pumps and substituting automatic control for manual control.

48" Storm Water Drain at Antapara—The work was started in June, 1938, and most of it was completed by the end of December, 1938. Later, the Municipal Board decided to proceed with further extensions and to utilize the savings due to low tendered rates received towards the cost. As this saving did not cover the full cost of the proposed extensions, the Board agreed to provide half of the excess over the estimate from their own resources and for the remaining half to approach the Board of Public Health for a grant-in-aid. The Board of Public Health sanctioned the revised estimate amounting to Rs.24,632, and at the same time sanctioned a grant of Rs.2,595-8. Due to these additional works the period for the completion of the works was extended to 15th May, 1939.

Additional works in connexion with 48" Storm Water Drain at Antapara—The additional works comprised of pitching at the end of the pucca platform near the tail of 48" storm water sewer, where scouring took place during the last rainy season and pointing the dry brick work of a portion of the platform in P. C. mortar which was postponed till the end of the rainy season, and also extending the 20" semi-circular drain further downwards to a length of about 800 feet. The Municipal Board provided a further sum of Rs.500 towards this work so that a length of about 800 feet could be constructed and the nuisance removed from the inhabited portion.

Tenders were invited for the above work and the lowest tender was recommended to the Board for their approval. The Board in their meeting held on the 30th November, 1939, approved of the recommendation and asked this Department to put the work in hand, which was completed in due course.

The total expenditure on the work amounted to Rs.24,510 including the cost of the additional works carried out.

*Supplementary estimate—48" Storm Water Drain at Anupara (Rs.6,840)—*The 12" semi-circular drain being about 5 to 6 feet below the road level in Mohalla Bhainsbahora, it was considered advisable to provide a retaining wall on the roadside as well as on the opposite side along the 12" semi-circular drain to support the earth bank and provide a parapet wall on this length on the roadside to protect cattle from falling into the drain when the road and drain are flooded.

The supplementary estimate comprising of the retaining and parapet walls was prepared by the Executive Engineer, I Division, Public Health Department, Meerut, and after approval by the writer, was transmitted to the Chairman, Municipal Board, for approval and for providing requisite funds. The Board being short of funds postponed the consideration of the project till revised budget for the year 1939-40 was passed. The Board has provided the requisite funds in the budget for the year 1940-41, and it is anticipated that the construction will be taken in hand in due course.

*Dig Darwaza Drainage (Alternative no. I Rs.40,097; Alternative no. II Rs.48,419)—*The Municipal Board asked for the preparation of a project to deal with the sillage discharging at Dig Darwaza. Necessary surveying and levelling were carried out and the project, prepared by the Executive Engineer, I Division, was approved by the writer. The project was returned to the Executive Engineer with the recommendation that alternative no. II amounting to Rs.48,419 was to be adopted. This has been forwarded to the Chairman, Municipal Board, for approval and for the provision of the necessary funds.

The Board of Public Health have approved Alternative no. II, but have intimated that they will not be in a position to give any grant towards this work during the next two years.

*Drainage (Rs. 70,200)—*An estimate amounting to Rs.70,200 was finally sanctioned in 1937-38. The Board of Public Health also sanctioned a grant of Rs.35,100 and placed the amount to the credit of this department for execution of the work and the Municipal Board also received the first instalment of loan amounting to Rs.20,000 during the year under review. Tenders have been invited and the work is expected to be taken in hand early in May, 1940.

MUZAFFAR-
NAGAR.

*Water supply maintenance—*Rezoning of the distribution system as well as other schemes of water supply improvement are long overdue. The steel rising mains from the pumping station to the reservoir have become old and frequently burst and require replacement in some portions. The Board have been advised to undertake a complete scheme for dealing with these defects.

NAINI TAL.

The Electrical and Mechanical Engineer complains of persistent waste of water at public standposts. He points out that all the metered consumers have to pay at the rate of Rs.3 per 1,000 gallons for water consumed, but less than 25 per cent. of the whole supply is accounted for in this way and a large portion of the remaining 75 per cent. is wasted by the public at standposts. Standpost waste preventing devices are objected to and broken by the public, but the Board is too lethargic or incapable of bringing to justice persons who are responsible for the damages. The Engineer complains of inefficient and utterly unskilled local staff and the Board ignore his complaints.

*Hydro-electric Undertaking—*The recommendations made by the Superintending Geologist of the Government of India have now been received and these emphatically endorse the opinion expressed by this department concerning the safety of the hill sides and the necessity of providing a standby power station. The Board now appear to be convinced and are taking steps at last to follow the advice given by this Department, which, for many years, they have ignored.

The Electrical Engineer has discovered a considerable number of defects in the electrical distribution system, which has not been altered, extended or augmented since it was first opened in 1921. Loads, meantime, have considerably increased which necessitates the power distribution system being completely

reorganized in order to comply with the rules of the Indian Electricity Act. Voltage is unduly low at a good many places and the Government Electric Inspector has given notice to the Board under the rules prescribed by the Act to rectify the defects within a definite period. The Board have taken steps in the matter and schemes of reorganization are under preparation by a firm of Consulting Engineers.

Drainage—A comprehensive drainage scheme amounting to Rs.1,63,278 prepared by the Municipal Board has been administratively sanctioned by the Board of Public Health. The Municipal Board propose to carry out the work through their own agency.

ORAI.

Water supply improvement—Estimated cost (Rs.92,610)—The scheme provides for a water supply to the whole town except the civil lines at the rate of 10 gallons per head per day. The tube well was completed in 1936. Tenders for pipe lines, tanks and other appurtenant works have been invited and the tender of Messrs. Manohar Pershad Radha Krishna accepted. Tender form and specification for pumping plant are under preparation.

Out of the total estimated cost of the work, Rs.42,610 have been placed at the disposal of Well Boring Operations Division, and the balance of Rs.50,000 will be paid when the amount is received as loan from Government in 1940-41.

PAURI (DISTRICT GARHWAL).

Water Supply—The Deputy Commissioner, Garhwal, requested this Department for the preparation of a forecast of cost for Pauri water supply and instructions were issued to Executive Engineer, I Division, Public Health Department, Meerut, to take the work in hand, but due to other more urgent works in progress staff could not be spared to investigate the source of supply and to carry out surveying and levelling of the town. The work is kept pending for want of staff and will be taken in hand when staff is available.

ROORKEE.

Septic tank latrines at Police lock-up (Rs.10,600)—A forecast of cost together with a layout of the soakage pits was prepared by the Executive Engineer, I Division, Public Health Department, Meerut, at the request of the Deputy Secretary to Government, Police Department, and it was forwarded to him for approval and disposal.

RIKHIKESH.

Drainage—The President, Notified Area Committee, approached this Department to split up the forecast of cost so that the Committee would be able to take the work in hand piece-meal. This Department accordingly split it up into two instalments but it is not yet decided by the Committee whether the fair project should be taken in hand or not.

SHAHABAD.

Drainage (Rs.54,132)—A forecast of cost prepared by Executive Engineer, II Division, Public Health Department, Allahabad, has been forwarded to the Municipal Board for their approval.

UNAO.

Water supply maintenance—The supply is continuous throughout the 24 hours and all connexions are metered and the pressures maintained are good. As regards repairs and overhauls of the pumping machinery and the provision of reasonable stores and adequate stock of spare parts to meet the war emergency, the Board have taken no action to follow the advice given by this department to obtain a short-term loan from Government.

Extension of distribution system (Rs.9,516)—A project amounting to the above cost has been prepared by the Executive Engineer, II Division, Public Health Department, Allahabad, and approved by the writer.

FREE ADVICE TO LOCAL BODIES.

Free advice has been given to the following local bodies:

(1) *Training of the river Jumna at Muttra*—The Chairman, Municipal Board, Muttra, requested for the preparation of proposals for training of the river Jumna at Muttra. The site was inspected and a survey of the river made. A report and estimate was prepared by the Executive Engineer and after approval by the writer, was forwarded to the Chairman, Municipal Board, but nothing has since been heard from the Chairman in this connexion.

(2) *Mussoorie sewage treatment*—The Executive Engineer, I Division, was instructed to inspect and report on the sewage treatment work and the report received from him has been forwarded to the Municipality.

(3) *Hathras waterworks—Pollution of water supply*—The work was inspected by an Assistant Engineer of the I Division, Public Health Department, and a report dealing with the causes of contamination has been received and communicated to the authority.

(4) *Dehra Dun Municipality*—A forecast of cost for duplicating the reservoir at waterworks has been furnished to the Municipal Board. The approximate cost is about Rs.46,500.

The Municipal Board, Dehra Dun, have also been advised regarding certain drainage works which they wish to carry out through their own agency.

(5) Advice has also been given to most Government departments on matters pertaining to sanitation and water supply.

F. D. TUNNICLIFFE, M.C., ASSOC., M.INST., C.E.,

Superintending Engineer, Public Health Department,

LUCKNOW :

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FORTY-FOURTH ANNUAL REPORT

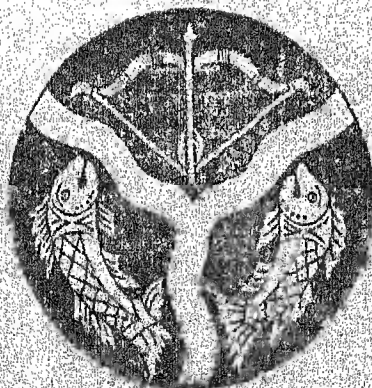
OF THE

SUPERINTENDING ENGINEER

PUBLIC HEALTH ENGINEERING DEPARTMENT

UNITED PROVINCES

FOR THE YEAR ENDED MARCH 31, 1939



ALLAHABAD

SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES, INDIA

1940

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FORTY FOURTH ANNUAL REPORT
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PUBLIC HEALTH ENGINEERING DEPARTMENT
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FOR THE YEAR ENDED MARCH 31, 1939



ALLAHABAD:
SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES, INDIA
1940

Forty-fourth Annual Report of the Superintending Engineer, Public Health Engineering Department, United Provinces, for the year ended 31st March, 1939

The table below shows the extent of the duties undertaken by this department during the year under review :

Item no.	Nature of work	Amount involved in lakhs of rupees	Remarks																												
1	Duties under the local Authorities Loans Act, 1914, and the Municipalities Act, 1916, i.e. the supervision and inspection of all open waterworks, drainage pumping stations and hydro-electric supplies.	77.17	<p>This amount represents the turnover in revenue and expenditure on water supplies, drainage pumping stations, sewage farms and hydro-electric supplies and is made up as follows :—</p> <table> <tr> <th></th><th>Revenue</th><th>Expenditure</th><th>Total</th></tr> <tr> <th></th><th>Rs.</th><th>Rs.</th><th>Rs.</th></tr> <tr> <td>Waterworks</td><td>31,64,889</td><td>29,18,715</td><td>60,83,604</td></tr> <tr> <td>Drainage pumping stations.</td><td>..</td><td>1,33,726</td><td>1,33,726</td></tr> <tr> <td>Sewage farms</td><td>56,444</td><td>25,918</td><td>82,362</td></tr> <tr> <td>Hydro-electric supplies.</td><td>*7,91,860</td><td>*6,25,098</td><td>*14,16,958</td></tr> <tr> <td>Total ..</td><td>40,13,193</td><td>37,03,457</td><td>77,16,650</td></tr> </table>		Revenue	Expenditure	Total		Rs.	Rs.	Rs.	Waterworks	31,64,889	29,18,715	60,83,604	Drainage pumping stations.	..	1,33,726	1,33,726	Sewage farms	56,444	25,918	82,362	Hydro-electric supplies.	*7,91,860	*6,25,098	*14,16,958	Total ..	40,13,193	37,03,457	77,16,650
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2	Local works—																														
	(a) Preparation of projects.	25.02	28 detailed proposals.																												
	(b) Construction ..	5.64	Payments made.																												
3	Provincial works—																														
	(i) Miscellaneous—																														
	(a) Preparation of projects.	5.83	17 detailed projects.																												
	(b) Construction ..	0.04	Payments made.																												
	(c) Maintenance ..	0.38	Lucknow Gomti Weir, Ghaziuddin Hyder Canal Anti-Malarial works, Allahabad Magh Mela and Executive Engineers, I and II Divisions' offices and residences.																												
	(ii) Allahabad District Public Works Department works—																														
	(a) Preparation of projects.	5.70	8 detailed projects.																												
	(b) Construction ..	1.05	Payments made.																												
	(c) Maintenance.																														

* This figure includes revenue and expenditure for Hardwar Electric Supply.

Item no.	Nature of work	Amount involved in Lakhs of rupees	Remarks
4	(a) Advice free to local authorities	9.30	22 forecasts of cost with reports furnished
	(b) Advice free to Government departments	0.41	7 forecasts of cost with reports supplied free
5	Board of Public Health business		
	(a) Examination of projects for urban works	69.53	51 projects and 11 forecasts of cost with reports supplied free
	(b) Examination of projects for rural sanitation	2.09	305 projects were scrutinized
	(c) Checking progress on urban and rural areas works G.O. nos 463/XI, dated the 6th February, 1931, 470/XI, dated the 6th February, 1931, 580/XI, dated the 11th February, 1931, and 490/XI, dated the 9th April, 1931.	0.86	Progress reports collected and consolidated for the Accountant General United Provinces
6	Examination of projects for Provincial works	5.15	25 projects, 2 forecasts of cost were examined.
7	Inspection and reports on works carried out by local bodies.	3.51	
8	Scrutiny of certain municipal budgets, G. O. no. 4718/XI—10H., dated the 6th January, 1933.	88.02	This represents the total figures of original budget schedules of income and expenditure of local authorities in towns possessing piped water supplies, drainage pumping stations and hydro electric supplies.

N.B.—The figures for the Allahabad District Public Works Department works have been also supplied to the Chief Engineer, Public Works Department, Buildings and Roads Branch, for inclusion in his annual report as required by Public Works Department, Buildings and Roads Branch, G. O. no. 957/MS/217/MS-252, dated the 7th December, 1936.

2. The expenditure on works carried out by the department during the year amounted to Rs.7.11 lakhs. The total value of works for which projects including preliminary proposals and forecasts of cost were framed amounted to Rs.46.46 lakhs during the year.

FEES AND REALIZATIONS.

3. A total amount of Rs.90,546 was earned in fees for works carried out for local authorities. These fees are levied in accordance with Government orders only on the duties undertaken under item 2 of the table above. The fees earned on the supervision of construction amounted to Rs.45,576 while the fees earned on the preparation of projects amounted to Rs.44,970, making up the total referred to above.

In addition to the above, a sum of Rs.551 was recovered for hire of tools and plant from contractors. A further sum of Rs.571 was realized as supervision charges on the value of works carried out in the workshops of the Well Boring Operations Division, Cawnpore.

4. The budget schedules of the local authorities received in this office show that a total turnover of Rs.88.02 lakhs took place during the year under the heads revenue and expenditure incurred on piped water supplies, hydro-electric supplies and drainage pumping stations. Those municipalities which provided piped water supply incurred a total expenditure of Rs.41.00 lakhs on these supplies during the year.

BUDGETS OF
LOCAL
AUTHORITIES.

WATER SUPPLY

5. There are now 25 public water supply undertakings in the province as against 12 in 1920. Twenty-three of the undertakings are managed by local authorities and two, Aligarh and Moradabad, by licensed undertakers, as permitted by the amendment to the Municipal Act of 28th October, 1933. The number of municipal hydro-electric undertakings, viz., two, remains the same as last year. The capital invested in the waterworks controlled by local authorities now amounts to Rs.3.38 crores.

NUMBER OF
UNDERTAKINGS

New waterworks at Brindaban, Moghal Sarai, Orai and Etawah have been taken in hand which show the public is becoming alive to the advantages of a piped water supply.

6. A total urban population of 1,654,073 is served by the undertakings, 1,554,073 by the concern administered by local authorities and 100,000 by the two undertakings, managed by licensees. The average daily supply amounted to 15.486 million gallons and the maximum average in any one month to 52.394 million gallons. The total consumption was 41.78 gallons per head per day at Cawnpore, the highest in the province and 3.00 gallons at Gola Gokaranath the lowest. The cost per thousand gallons of water supplied amounted to 0.81 annas at Meerut, the capital charges having been liquidated, and to 2.66, 2.55, 1.78, 1.66 and 2.67 annas respectively at Agra, Allahabad, Benares, Cawnpore, and Lucknow. The total cost per thousand gallons at Naini Tal which is the highest in the Province, amounted to 26.77 annas.

POPULATION
SERVED AND
COST OF SUPPLY

In this Province there are eight first class cities having a population of over one lakh. Of these Bareilly is the only city which has no piped water supply. It is, however, understood that a private company is negotiating with the Municipal Board, Bareilly, for obtaining a licence to supply water to this important town.

Under second class cities, which are ten in number, with a population ranging between 50,000 and 100,000, there are only six cities which have a piped water supply. While in class III cities, having a population varying between 20,000 and 50,000, out of the 28 towns only 3 possess this necessity of life. Thus in these three classes of towns alone there are at least 30 towns which lack this most essential amenity. It will thus be seen that there is a great scope for the extension of piped water supply even if only the bigger towns of the Province are tackled to provide them with a modern system of water supply.

7. The following boards managed to run their waterworks at a profit : Agra, Allahabad, Cawnpore, Lucknow, Meerut, Mussoorie, Dehra Dun, Mirzapur, Muttra, Hardwar, Unao, Kosi and Haldwani.

PROFIT AND
LOSS.

Deficits were incurred at Benares, Naini Tal, Jhansi, Fyzabad, Fatehpur Sikri, Almora, Golagokaran Nath, Hathras, Jaunpur and Ghazipur. Taking the financial position as a whole, there was a nett profit on the year's working of Rs.2,46,174. But during the year an amount of Rs.3,05,267 was spent on capital works from revenue. If this is taken into account, the gross profit on all the undertakings managed by the local authorities will amount to Rs.5,51,441.

8. The inspection reports of the Waterworks and Mechanical Engineer show that the mechanical plant at most of the waterworks has been maintained fairly satisfactorily, but this cannot be said of the management of the distribution system, as due to haphazard extensions and overloading of mains, unequal

MAINTENANCE
OF THE WATER
WORKS AND
WATER SUPPLY
IN GENERAL.

distribution in the large cities has become chronic. Reorganization of the distribution systems in the large towns is therefore imperative, but this question is inter-linked with waste prevention and unless proper measures are taken to reduce the waste to a reasonable figure, not much advantage will be gained by spending large sums on reorganization works.

The Waterworks and Mechanical Engineer has made suitable recommendations for improving the condition of the waterworks, but it is regretted that due attention is not paid to the recommendations made. In some of the waterworks such as Benares, Cawnpore, Meerut, Mittra and Naini Tal, although the consumption is increasing, a regular decrease in the income is noticeable. This fact alone should be a warning to the local bodies that the recommendations of this department should not be lightly set aside.

Cawnpore has decided to spend about Rs.22 lakhs, Agra about Rs.15 lakhs and Allahabad also about Rs.13 lakhs to reorganize and improve their waterworks. Lucknow has proceeded to a certain extent with its programme of capital expenditure on works for which there has been a demand for some years but much still remains to be done.

Jhansi and some of the smaller undertakings have resolved to proceed with improvement schemes but there are others more in dire need of new works, such as Kosi and Fatehpur Sikri, where the duplication of the plant should not be delayed any longer. The duplication of the plant at the newly started waterworks at Ghazipur should also receive the attention of the municipal board.

WASTE PREVENTION MEASURES.

9. Although waste prevention measures have been started in all the waterworks according to Government orders, and considerable increase in the staff has taken place in some of them to cope with this work, it is found that the progress made has not been commensurate with the expenditure incurred. It seems that unsuitable staff, who are afraid of using their hands and cannot even undertake minor repairs, have been appointed. It is suggested that every board should review the work of the waste prevention staff periodically and if no improvement is shown by the staff, replace them by suitable ones until the waste is brought down to and kept within a reasonable limit.

METERED SUPPLIES AND CONTROL.

10. Very little progress has been made in regard to the installation of water meters. The Allahabad and Lucknow boards have both purchased water meters from the loans of Rs.50,000 made available to each of them, but they have not yet been installed. The Benares board went last year to the other extreme and removed all the meters installed, even where they had been put in view of excessive wastage and improper use.

MANAGEMENT.

11. The real test of the successful management is the percentage of water that can be accounted for. This should be in the region of about 90 per cent. Towns like Unao, Hathras, Kosi and Jaunpur, which followed the advice of this department and gave only metered connexions, can account for 90.08, 94.71, 97.50 and 94.49 per cent. respectively of the total water supplied. While the larger towns, such as Lucknow, Cawnpore and Agra can account for only 41.67, 60.56 and 47.13 per cent. respectively.

SHORTAGE OF WATER IN THE LARGE TOWNS.

12. Shortage of water in the outlying districts of all the large towns still persists. Cawnpore has already embarked on the huge scheme of water reorganization and Lucknow has also approved a programme of expenditure amounting to several lakhs of rupees. Scheme for complete reorganization of Agra is already in hand while Allahabad is also eager to proceed with the reorganization scheme. This expenditure, however, will be of no avail unless the rules and bye-laws are more rigorously enforced and misuse of water is prevented, as otherwise the waste would increase, when more water at a higher pressure is made available due to further reorganization.

MUNICIPAL ENGINEERING STAFF.

13. In spite of the fact that there is so much unemployment amongst the qualified technical men, it is noted that the type of qualified and experienced hands required to man the services under local boards are usually not forthcoming. To some extent this is due to the fact that the conditions of service under the local bodies are not considered very satisfactory or even secure. This dearth, however, cannot all be attributed to this factor alone. If, however,

this drawback is combined with the want of opportunities for suitable training of the students coming out of the technical colleges this dearth of candidates for filling the vacancies is not at all difficult to explain. Some method will therefore, have to be found for providing suitable training to the qualified but raw material turned out by the colleges and it is suggested that every municipality, which has a waterworks and other municipal engineering works under their control should train one or two civil as well as mechanical and electrical engineer students on their works. These men should be given a few months training in the Public Health Engineering Department also at some stage of their training. In this way properly trained engineers will be available for filling the vacancies as they occur. Along with this training, however, it is most essential that the conditions of service under the local bodies should also be improved which can be easily done by reorganizing the important services on a provincial basis.

11. The Superintending Engineer in the year 1933 suggested the formation of a committee to examine the water supply rules and to suggest revision where necessary and to advise on other matters in connexion with the administration of the waterworks. No action was taken until Mr. Tumiciffe took over the office of Superintending Engineer when the matter was raised again by him. After prolonged correspondence and on the recommendation of the Board of Public Health, the Government passed orders in G. O. no. 6555/XI-463, dated the 24th January, 1939, for the constitution of a committee as follows :

WATER LAW
AND THE
MODEL BYE-
LAWS.

Chairman

(1) Superintending Engineer, Public Health Department, United Provinces.

Members

(2) Mr. C. W. Cassé, Waterworks and Mechanical Engineer, Public Health Department, United Provinces.

(3) Rai Bahadur Dr. A. C. Banerji, Assistant Director of Public Health, United Provinces.

(4) Mr. Khurshed Lal, M.A., LL.B., Chairman, Municipal Board, Dehra Dun.

(5) Mr. R. N. Basu, B.A., LL.B., M.L.A. (Central), Chairman, Municipal Board, Allahabad.

(6) Rai Bahadur Dr. S. N. Tewary, Executive Officer, Municipal Board, Cawnpore.

(7) Rai Bahadur B. M. Vyas, M.A., LL.B., Executive Officer, Municipal Board, Allahabad.

(8) Khan Bahadur P. S. Dastoor, Waterworks Engineer, Municipal Board, Benares.

(9) Mr. S. N. Sanyal, as representative of Messrs. Sen & Sanyal, Sanitary Engineers, Lucknow.

(10) Khan Bahadur Hafiz Ghazanfar Ullah, M.L.A., as representative of Messrs. Noorullah Ghazanfarulla, Managing Agents for the Moradabad and Aligarh Water Supply Co's., Allahabad.

Secretary

(11) Mr. S. G. Naravane, Secretary, Board of Public Health, United Provinces.

The terms of reference of the Committee are :

(1) To inquire whether sections 224—235 of the United Provinces Municipalities Act, 1916, and the rules made thereunder, viz. the United Provinces Municipal Water Supply Rules in part II, Chapter VII of the Municipal Manual, and the model water supply rules at pages 393 to 399 of that Manual, which deal with the subject of water supply within the United Provinces municipalities are suited to present conditions, and if they are not, to make recommendations as to the way in which they should be revised. In this

connexion the Committee should examine the draft water supply rules prepared by Mr. G. McC. Hoey, late Superintending Engineer, Public Health Department, and advise Government on their adoption or modification.

(2) To review the several Government Orders issued on the control and metering of municipal water supplies, and to advise Government whether the present ferrule system of assessment should be retained, or whether supply should be by measurement, or whether a combination of both methods should be introduced.

(3) To examine the new standard specifications for waterworks pipes and fittings and to report on their suitability for adoption by all municipalities administering their own waterworks. The Committee is authorized to appoint a technical sub-committee and to co-opt outside members to examine the new specifications and to advise whether they are suitable.

(4) To consider and make recommendations to Government on the question of limiting the profits on waterworks with a view to reducing the water tax if surplus profit is available.

(5) To consider and advise Government whether in towns where water tax is not levied, e.g. Meerut, Mirzapur, Aligarh and Moradabad, the supply of water should not be made freely available to all the inhabitants residing in the municipal area instead of being to a large extent restricted to certain areas and in the case of undertakings managed by licensees mainly to consumers who can afford a metered supply.

(6) To enquire into the working of waterworks managed by licensed undertakers and to advise Government whether the rules in force in the towns where such waterworks are already operating require modification before adoption in other towns.

(7) To examine the rules relating to the appointment of municipal waterworks staff and to make recommendations to Government for organizing such staff on a more efficient basis.

(8) To report and make recommendations to Government.

It was not possible to hold any meeting of this committee during the year under review but it is hoped that the committee will finish its work and submit a report with recommendations by the end of the year 1939.

DRAINAGE

SEWAGE PUMPING STATIONS.

15. Two new stations, viz., one at Hardwar and the other at Permatghat, Cawnpore, have been added to the existing number and are giving satisfactory service.

DRAINAGE CONDITIONS.

16. Drainage conditions in the large towns are still as bad as ever and no efforts are being made to improve them.

A joint inspection of the insanitary condition existing at Agra was made by the Director of Public Health and the Superintending Engineer, Public Health Department, and a report of the minimum measures required to improve the situation was submitted to Government. No action has been taken on the recommendations of the Lucknow Drainage Inquiry Committee. The sewerage system at Cawnpore is also badly overloaded. Benares also has not done any thing to improve its drainage.

At all these places raw sewage is allowed to discharge into the rivers and it is a question how long is this pollution of important rivers to be tolerated. As a matter of fact this pollution is getting intensified, as the waterworks are being reorganized and larger and larger quantities of water are being made available for consumption. It is therefore time that something was done to put a stop to this unsatisfactory state of affairs. It may probably be necessary to pass an Act to prevent pollution of the rivers in the interest of health, well-being and the religious susceptibilities of the people.

SEWAGE PURIFICATION.

17. The question of pollution brings to the forefront the question of sewage purification in the towns having underground sewerage. So far a number of sewage farms are working fairly satisfactorily at different places, but it is

is evident that they are gradually getting over loaded for the simple reason that enough land of a suitable type cannot always be found in the vicinity of the towns. Consequently as the water supply demands increase and water borne sewage systems are installed, it will be necessary to purify the sewage as is being done in other civilised countries before it is discharged into streams.

18. The drainage scheme at Hardwar has been successfully completed and with its concrete pavements, this important place of pilgrimage is now perhaps the cleanest town in the Province.

DEVELOPMENTS

The public, especially the people living in bungalows are now becoming alive to the advantages of having sanitary fittings, but as there are no sewers in many places and the water supply is intermittent, small septic tanks are being used and those who can afford it are putting up suitable tube wells for their water supply also. This is a healthy sign and should be encouraged as much as possible.

GENERAL REMARKS

19. There is no marked improvement in health works, other than water supply and drainage, such as the provision of hospitals, markets, model lodging houses, dispensaries, town planning (other than schemes executed by Improvement Trusts) and the like for which there is much need in the Province.

HEALTH WORKS
OTHER THAN
DRAINAGE AND
WATER
SUPPLIES.

Owing to financial stringency the Board of Public Health was not in a position to sanction any substantial grant for the construction of infectious diseases hospitals at Allahabad, Gorakhpur and Bareilly.

The Allahabad Municipal Board is, however, very keen to construct their infectious diseases hospital and therefore they have been advised to finance the scheme by taking a loan from Government. It is most likely that this work will be started in the next year, i.e., as soon as Government sanction the loan.

20. The important question of having suitable fire fighting appliances in the local boards has again come to the fore recently. The outbreak of fire during the last Kumbh Mela at Hardwar, causing a considerable loss has indeed demonstrated how essential and vital these appliances are for the Local Boards and Mela Authorities. The Hon'ble Minister for Local Self-Government in her recent speech at Hardwar drew attention of the Local Boards and Mela Authorities to this matter. On an inquiry made by Government, the Superintending Engineer, on the advice of the Waterworks and Mechanical Engineer, suggested the design and type of suitable appliances for use of the above named authorities and it is hoped that every local body will equip itself with proper fire fighting apparatus as early as possible.

FIRE FIGHTING
APPLIANCES.

21. As reported last year the demand for better housing conditions among all classes of the population in urban areas is rapidly on the increase. From a perusal of the information received from the three Improvement Trusts in these Provinces, viz. Allahabad, Cawnpore and Lucknow it appears that with the exception of Cawnpore, little progress has been made by the other towns in the direction of providing suitable tenements for the working classes.

HOUSING
CONDITIONS.

The Cawnpore Trust is taking a leading part in this undertaking and during the year 1937-38 constructed 30 new ahatas with 778 tenements for industrial workers. During the year under report large tracts of land have been sold at concessional rates to one of the millowners for the construction of his own settlement. The Trust has also set aside a special area in which plots are sold to private investors for the construction of tenements for factory workmen, besides constructing about 200 houses which are sold to workmen on 12 years instalment system.

22. The post of Superintending Engineer, Public Health Department, was held throughout the year 1938-39 by Mr. F. D. Tunnicliffe, who was confirmed as Superintending Engineer, Public Health Department, United Provinces, with effect from the 15th September, 1938, the date on which Mr. G. McC. Hoey retired from public service.

STAFF.

The post of Personal Assistant to the Superintending Engineer, Public Health Department, was held by Mr. S. C. Narayan, who also acted as Secretary, Board of Public Health.

The post of the Waterworks and Mechanical Engineer was held by Mr. C. W. Cassé, and that of Assistant Engineer (Mechanical) by Mr. N. B. Gupta.

Mr. H. G. Trivedi continued as Executive Engineer, I Division, Public Health Department, Meerut, and Mr. K. Chattopadhyaya, as Executive Engineer, II Division, Public Health Department, Allahabad, while Mr. Syed Maqbul Husain, permanent Assistant Engineer, continued to officiate as Executive Engineer, Well Boring Operations Division, Public Health Department, Cawnpore, vice Mr. N. D. Chondhury, temporary Executive Engineer, Well Boring Operations Division, who remained on leave on medical certificate throughout the year.

In addition to the staff enumerated above, one permanent Assistant Engineer and four temporary Assistant Engineers, nine overseers, nine temporary subordinates and the requisite number of computer, draftsmen and clerks were employed.

The staff of the Department has rendered assistance to the Thomason Civil Engineering College, Roorkee, the Lucknow University and the Registrar, Departmental Examinations, Allahabad, as examiners and lecturers on Engineering subjects.

The Superintending Engineer, the Waterworks and Mechanical Engineer and the Personal Assistant to the Superintending Engineer have been appointed as mentioned before on the Committee set up by Government to inquire into the whole problem of water supply in the United Provinces as its Chairman, Member and Secretary respectively.

The staff of the department were very busy throughout the year and had to work overtime to keep abreast with the work. Several important works such as Agra Water Supply, Moradabad Drainage, Ballia Drainage, Bisalpur Drainage, Shahabad Drainage and Kosi Water Supply were not undertaken for want of staff.

As more than half the staff of this department is temporary, great difficulty is experienced in obtaining suitable persons for recruitment in this department when occasion arises. Recommendations for the confirmation of these men in the permanent cadre have already been submitted to Government and it is hoped that their case will be given a favourable consideration.

ACTIVITIES OF LOCAL AUTHORITIES

AGRA.

Water Supply Maintenance--Inspection reports of the Waterworks and Mechanical Engineer disclose that the plant has become very old and so requires renewal. The project for the complete reorganization of the Agra Waterworks has been taken in hand and in the meantime steps have been taken to purchase sufficient spares to keep the plant going.

During the year under report several works were carried out by the Board such as desludging of the settling tanks, complete overhauling of the mechanical filters and the purchase of chloronome for sterilizing the water.

The Boosting sets at the Mental Hospital gave trouble due to their being worked under damp atmosphere. New sets have been purchased for replacing the old ones which were burnt out. The constant complaint of shortage at the Mental Hospital has now been removed.

The staff arrangements at the waterworks continued to be unsatisfactory. The advice given by this department for the appointment of additional staff was not accepted by the Municipal Board. On the other hand the strength was reduced by one Engineer for the time the Superintendent remained on leave.

Arrangement for the purchase of materials such as coal, oil etc. was also not satisfactory.

The waste prevention work suffered a setback due to the abolition of the metering scheme and due to the fact that the night tests were also not carried out properly.

One hundred and nine new water connexions were given during the year, out of which only 15 were metered. The total number of house connexions has increased to 6,116 out of which only 410 are metered. Seventeen new standposts were also erected during the year.

Water Supply Improvement—The forecast of cost amounting to Rs.14,38,000 for the reorganization and extension of the water supply was approved and fees amounting to Rs.31,657 for the preparation of the detailed proposals were deposited by the Municipal Board. The preparation of the project is in progress.

Drainage—The drainage of this important town has been badly neglected. A joint inspection of the important areas was carried out by the Director of Public Health and the Superintending Engineer, Public Health Department, on 30th March, 1939 and a forecast of cost amounting to Rs.10 lakhs as a first working instalment to improve the drainage has been submitted to Government.

Water Supply Maintenance—This waterworks which is managed by the Licensees, Messrs. Noorullah Ghazanfarullah of Allahabad, provided an adequate supply of water to a large portion of the town. All private connexions which now number 805 are metered. The supply through private connexions in the low zone is continuous throughout the twenty-four hours, while 8 hours supply is given to the high zone. The supply from the standposts is made available only during certain hours of the day. As advised by this department a chlorinating plant has been installed and the supply since then has been satisfactory. ALIGARH.

Water Supply Improvement—The licensees have sunk two more tube wells for improving the water supply and therefore the complaint regarding the contamination from the previous wells, which are situated in a low lying area subject to flooding, has been greatly minimised. There are still large areas to which water is not supplied from the waterworks and it is extremely desirable that the Municipal Board should impose a suitable water tax so that the benefits of pure water supply may be shared by the whole of the municipality.

Drainage—There is no improvement to record during the year in the drainage condition of the town. Most of the street drains are of antiquated pattern, and require replacing; the sewage discharges into the low lying areas on the outskirts of the town.

Water Supply Maintenance—The mechanical plant at both the filtered and the unfiltered stations was maintained in a fairly satisfactory condition. A scheme has been sanctioned for replacing the pumping plant at Khusrubagh in which variable speed motors have been provided so that the plant may work according to the varying requirements. ALLAHABAD.

Unfiltered water is still being supplied on the way from Karelalbagh and the Board have been advised to meter all such connexions so that the quantity of water thus supplied may be correctly ascertained and properly accounted for in the water supply returns.

The pumping plant at Daraganj has become obsolete, and is proposed to be replaced by an electrical set.

No night tests were conducted due mostly to the communal riots, which broke out off and on during the year. It is desirable that measures to prevent waste should not be relaxed and that defaulters' connexions are metered as quickly as possible.

Due to increased demand for water and due to the fact that the waste prevention measures have not been carried out, the supply could not be made continuous. The proposed changes in the pumping plant at Khusrubagh will improve matters.

The staff arrangements have not been quite satisfactory, and advice given by this department was not always accepted.

During the year 384 private connexions were given and 21 new standposts erected. It is gratifying that five new hand pump type standposts, as suggested by the Waterworks and Mechanical Engineer, are being erected.

Water Supply Extension : Two tube wells in Civil Lines—Pumping Plant (Rs.71,742)—Messrs. Harland Engineering Co., Calcutta, supplied the electric driven borehole pumps with accessories. Both the plants were fitted up and were running since the middle of December 1937. But the motors have not proved satisfactory and had to be replaced by new motors after which both the plants at Katia and Thornhill Road began to supply water to the public. Official final test will take place shortly after minor adjustments are made by the firm.

The work of supplying and fitting up overhead tanks and pipe lines, etc. for both the tube wells was also completed.

The two new tube wells constructed in the Civil Lines have given relief to the people of that locality by providing adequate supply under sufficient pressure and no trouble was experienced during the hot weather. There is, however, still a lot to be done to relieve the scarcity in the outlying districts.

Meters have been purchased out of the loan of Rs.50,000 and it is believed that these will be installed in due course.

Temporary Water Supply for three months for Municipal Board, Allahabad, from Magh Mela Tube Well—Due to scarcity of water in Daraganj Area, the Municipal Board, Allahabad, requested the Superintending Engineer, Public Health Department to arrange for a supply of water from Magh Mela Tube Well which was supplied for three months at 10 hours a day.

Magh Mela Water Supply Maintenance, Allahabad (Rs. 14,578)—The works were completed in time and maintained satisfactorily. The fire brigade engine was borrowed from the Municipal Board as usual. An expenditure of Rs.12,439 was incurred during the year.

Magh Mela Water Supply and Maintenance of Pumping Plant and temporary shed (Rs.1,335)—The oil engine driven air-lift-cum-centrifugal pumping plant in charge of this division was thoroughly overhauled and necessary spare parts were also purchased. The water supply was maintained satisfactorily throughout the mela period. An expenditure of Rs.800 was incurred during the year.

Magh Mela Electrification (Rs.11,000)—Messrs. the Universal Engineering Co. Ltd., contractors for electrification, completed the work in time and maintained it satisfactorily throughout the mela. An expenditure of Rs.10,015 was incurred during the year. The electric supply was made available in bulk by the United Provinces Electric Supply Co., Allahabad.

Tube Wells in Police Lines (Rs.1,615)—The Inspector General of Police, United Provinces, proposed to instal a tube well along with an electro-motor pumping plant in the existing masonry well in Police Lines, Allahabad. A 6" boring has been completed to a depth of 250 feet and a 4" tube well will shortly be lowered.

Drainage—In addition to Katra-Colonelgunj Drainage Scheme, the Municipal Board have also prepared during the year the Naini Sewage Farm project no. 2, and the preliminary project for the improvement of open space for the Jumna bank.

A loan of Rs.1,90,392 for the provision of a new rising main across the Jumna Bridge at a cost of Rs.84,697 and extension to the Sewage Farm amounting to Rs.1,05,695 was sanctioned by Government in July, 1938. The work will be carried out by the Municipal Board through its own agency. Tenders for the rising main have been called.

Infectious Diseases Hospital Scheme (Estimated cost Rs.1,97,694)—The project has received administrative sanction of the Government. The hospital will be constructed in an open space near Alopibagh and steps are being taken to acquire the site. It is proposed that the outdoor block will be taken up first so that the Daraganj Dispensary, which is at present located in a rented building, may be removed to this building.

Alithabad District P. W. D. Works—A separate progress report has been applied to the Chief Engineer, Public Work Department, Buildings and Roads Branch for inclusion in his Annual Administration Report.

Water Supply Maintenance—As there is great scarcity of water during summer every year, improvements to the Board's water supply have become very necessary. Spring sources continue to give sufficient water for the major part of the year but when water is most needed, the discharge decreases. In view of the gradual decrease in the yield of these springs, the Board is anxious to go in for the Kosi river pumping scheme instead of extending the system by adding more springs to the sources of supply. ALMORA.

Bacteriological analyses have continued to be unsatisfactory but the Board has not agreed to instal the simple and inexpensive system of chlor-ammoniating the supply, the scheme for which is already with the Board.

The distribution system was maintained satisfactorily with the exception of some of the standpost storage tanks, which have become worn out. It has been suggested that sanitary types of masonry tanks should, in future, be constructed. The water supply rules have not yet been adopted and effort is being made to introduce them as early as possible.

The Board is very anxious to have electric supply also for the town and if this matures, electricity could be used for pumping water from the river Kosi during the summer months. Efforts are being made to introduce electricity and also to improve the water supply.

Water Supply Improvement : Re-testing the yield of Tube Wells (Rs.1,138)—AJODHYA.
As the Ajodhya Water Supply Scheme is being drawn out, it has been found necessary to know the present yield of the existing tube wells constructed by this department some years ago. Both the tube wells were tested and gave satisfactory discharge. An expenditure of Rs.1,138 was incurred during the year.

Drainage—A few new drains have been constructed which has improved the drainage of the town to a certain extent. No effort has, however, been made to tackle the main drainage scheme designed to improve the sanitary condition of this important pilgrimage town.

Water Supply Maintenance—The old plant along with the tube well is in a hopeless condition and will soon have to be replaced. A detailed scheme for this, which includes the extension of the distribution system also, was furnished to the Board in 1936, but due to lack of fund this important matter has not yet received the attention of the Board. BAHRAICH.

Water Supply Improvement : Syed Salar Fair Water Supply (Rs.37,920)—The detailed estimate amounting to Rs.37,920 for water supply to Syed Salar Fair including pumping plant and distribution system was prepared in 1936-37. It has been sanctioned by the Board of Public Health and the necessary allotment for the construction of the tube well only has been made. Tenders were invited and the contract for the construction of the tube well has been awarded to Messrs. Saroup and Bansilal of Lahore. The work is well in hand.

Construction of a 2½" tube well in Government High School (Rs.1,112)—BALLIA.
The Inspector of Schools, V Circle, Benares, reported that the water of the well in the compound of Government High School, Ballia, is contaminated and is not potable. It was, therefore, proposed to construct a 2½" tube well in the existing well. The work is well in hand and 6" boring up to 150 feet below ground level was completed during the year under review.

Water Supply Maintenance—The mechanical plant both at the filtered and the unfiltered pumping stations was maintained in first class order and the Superintendent has introduced many improvements. During the year controversy arose about the electric supply agreement and as the Supply Company was not prepared to reduce the rates, the Municipal Board decided to have their own power house for the supply of electric current both for the waterworks as well BENARES.

as for street lighting. Subsequently the Company agreed to reduce these rates considerably and the rate offered for water pumping is the lowest of all the water works in the Province.

Water Supply Improvement—The construction of two new slow sand filters was completed, but only one filter could be put to work during the year. The Board sanctioned the construction of two additional filters and it is expected that all the four new filters will be in commission next year, when a twenty-four hours supply may become a practical proposition, provided adequate measures are adopted to prevent waste.

As practically all the meters have been removed, little success has been achieved in the direction of waste prevention and the result is that the hours of supply, which were increased after the meters were installed, had again to be curtailed, as there was no check on the consumption of the consumers. The only places where meters now exist are the gardens and the new buildings under construction.

During the year no night tests were conducted and the matter has been reported to Government, as it is a contravention of the Government orders.

During the year 323 new connexions were given bringing the total of private house connections to 18,281. In addition, there are 1,106 connexions for other purposes, such as standposts, cattle troughs, latrines, animals, pail depots and fire hydrants etc.

The workshop attached to the waterwork continued to be as lucrative a proposition as before.

Drainage—There was practically no progress in the construction of new drainage works due to lack of funds. The Municipal Board should, however, make earnest efforts to prevent the pollution of the river front and effective steps should be taken to stop the nuisance created near the bathing ghats.

General: Tulsighat Trial Bores (Rs.1,825)—This work was carried out on behalf of Kashi Tirth Sudhar Trust. The trial bores were required to ascertain the nature of the strata under the bed of the river for designing the foundations of Tulsighat, which was badly damaged during the last floods. The work was taken up in May, 1937, and 6" trial bores were carried down approximately 100 feet in each case and the type of strata reported to the Collector, Benares. The work was completed in May, 1938.

BRINDABAN.

Kumbh Mela Water Supply (Rs.17,938)—At the request of the Chairman, Municipal Board, Brindaban, temporary arrangements for supplying water during Kumbh Mela were made from the tube wells, constructed by this department in 1936. A temporary steam plant was fixed at site; the necessary pipeline was laid and an elevated tank together with a few pilgrim tanks and standposts were erected. Water was supplied to the Mela satisfactorily up to May, 1938.

Water Supply Improvement—The Municipal Board suggested that a permanent partial scheme to cover that part of the town where the wells were brackish may be carried out as an extension to the pipe-line already laid on the occasion of the Kumbh Mela. A detailed project amounting to Rs.34,144 was prepared and approved by the Superintending Engineer, Public Health Department and the Municipal Board. The Board of Public Health sanctioned a grant of Rs.17,072 to cover half the cost of the scheme. The other half is to be found by the Municipal Board out of the loan for which a loan application has been submitted to Government by the Board for sanction.

Drainage—After the completion of the waterworks the question of dealing effectively with the drainage of the town will have to be seriously considered. No drainage works of any importance were carried out during the year.

CAWNPORE.

Water Supply Maintenance—The waterworks continued to function satisfactorily during the year. The demand for water has greatly increased due to the extensions of the built-up areas and the supply is now totally insufficient for the needs of the town. It is hoped that this trouble will be over after reorganization works are completed and effective measures are taken to prevent waste.

During the year, 1,161 house connections were made, amounting in total to 5,060 connections. The number of public hydrants also increased from 782 to 805.

Water Supply Improvement—The Consulting Engineer, Messrs. Williams & Temple have prepared a scheme for the entire reorganization of the water supply system. Tenders for various contracts were invited. The tender for the pipe line was once accepted but due to some dispute, Government have advised the Board to invite fresh tenders. As the quality of water was not satisfactory, a chlorinating plant has recently been installed as a part of the reorganization scheme.

Drainage : Cawnpore Main Drain, Parnalghat Sewage Pumping Station Reorganization—As mentioned in the last year's report, the contract for pumping plant has been given to Messrs. Turner, Hoar & Co., Bombay. The plant consisting of transformers, H. T. & L.T. switch gears, one 3,000 gallons per minute motor driven slung type pump, two 1,500 gallons per minute motor driven vertical spindle pumps, flume recorder, and accessories have all been received and erected. The slung type pump gave a lot of trouble and has been abandoned. The two 1,500 gallons per minute capacity pumps have been tested and handed over to the Municipal Board, Cawnpore, in a satisfactory working condition.

The contract for the rising main and the pump house was given to Messrs. P. P. De & Co. and all work except fixing a 24" S. V. in sump well for two 1,500 gallons per minute pumps was completed during the year.

Water Supply Maintenance : Maintenance of Pumping Plant and Distribution System.—The new filtration plant worked satisfactorily throughout the year. Owing to the popularity of the waterworks and due to the growing demand of the public, the number of metered connections rose during the year from 505 to 911 and about 37 new standposts were also erected. In view of the growing demand of water, the plant will soon have to be augmented and more water taken from the Bandal river.

DEHRA DUN

The Supply from Kolukhet greatly helped towards solving the problem of water as it was diverted into the main Bandal reservoir.

The Bandal Nadi Scheme, which was completed last year, has solved the acute problem of the water supply of this growing town. Since its completion, a small portion of the gravity main in the bed of the Badi Nadi got exposed. A concrete spur and a few bath spurs, built to divert the Nadi, proved extremely satisfactory.

The Board and the staff at the waterworks worked in harmony with this department.

Water Supply Improvement—As already mentioned in last year's report, the reorganization of the old distribution system is well in hand and it is expected that the entire work will be finished within a short time.

During construction, the Board considered it necessary to provide pipe lines in some more lanes, which, to keep the cost down, were left out of the original project. The cost of these extra mains will be about Rs.60,000, for which the Board has applied to Government for a loan.

Drainage—The western portion of Dehra Dun is in an extremely insanitary condition. The Board's attention has been drawn to the fact from time to time and it was only recently that the Chairman asked this department to prepare a fair project for a portion of this area. The area is being surveyed and the scheme is under preparation. The Board has been advised to get a project prepared for the whole of this area, as the preparation of schemes piecemeal is not advisable.

Sewage Farm—The work of the extension of the Sewage Farm was completed in 1936. The farm was let out during the year 1936-37 for Rs.3,150, during 1937-38 for Rs.2,600 and during 1938-39 for Rs.3,550. The return which the Board is getting on a total investment of Rs.24,898 only is very satisfactory indeed.

DEWA.

Water Supply Improvement : *Dewa Fair Water Supply Extension of pipe line to Dargah (Rs.7 893)*—An estimate amounting to Rs.7 893 was prepared for the above work by the Executive Engineer, Well Boring Operations Division in 1937-38, which has been approved and sanctioned. The Board of Public Health gave Rs.5,000 as grant-in-aid and the balance of the money has been found by the Secretary, Dewa Fair and Exhibition Association. Tenders have been called for the execution of this work.

ETAWAH.

Water Supply Improvement : *Etawah Water Supply (Rs.1,74,712)* At the request of the Chairman, Municipal Board, Etawah, an estimate amounting to Rs.1,74,712 was prepared by the Executive Engineer, Well Boring Operations Division, and sanctioned in August, 1938. As the scheme depends on the actual yield of the tube wells, it is proposed to sink the tube wells first and hence tenders for the same have been invited. Orders to start the work will shortly be given.

FATEHPUR SIKRI.

Water Supply Maintenance—The water supply to this town was maintained during the year without any serious interruptions except for the period of three weeks when the plant was completely overhauled. There is only one set of pumping plant and it is essential that a duplicate set is installed as early as possible. It seems that owing to want of funds, the Notified Area Committee cannot undertake this work without the assistance of Government.

As there are only a few private connexions, the undertaking is financially unsound. Suggestions to improve the finances were given, but nothing has been done to increase the number of private metered connexions.

The staff as reported last year is limited and there is no one sufficiently qualified to take charge of the works during the absence of the Waterworks Superintendent. It may not be possible to obtain the services of a suitable man in case of an emergency, unless arrangements are made to appoint a qualified Assistant Driver.

FYZABAD.

Water Supply Maintenance—The mechanical plant has been maintained fairly satisfactorily and credit is due to the Waterworks Superintendent, who does his best in taking care of the machinery under his control.

The three sets of Vitri chlorinators, which were installed as an experimental measure, proved satisfactory and were successful in sterilizing the entire supply of the town.

The staff arrangement has been very unsatisfactory and it is essential that adequate and experienced staff is appointed to look after the machinery which is fairly old and requires systematic and frequent overhauling.

During the year 66 connexions were added. Hand pump type standposts as advised by this department have not yet been erected. The Superintendent has, however, devised a public standpost with rotary motion arrangement. The Municipal Board should erect one or two such standposts as an experimental measure and report if it proves successful.

Water Supply Improvement : *A tube well near existing tube well no. 3.—Pumping Plant for—(Rs. 25,138)*—The contract for this work was given to Messrs. Jessop & Co., Ltd., Calcutta. An oil engine driven air compressor with accessories to work the air lift pump in the new tube well has been supplied and erected. The plant has been tested and handed over to the Municipal Board, Fyzabad.

The Board has been contemplating to apply for a loan of Rs. 10,000 for the purchase of meters. Although this amount is not adequate, yet it will certainly help to solve the problem of waste to a certain extent.

In view of the increasing demand and the diminishing yield from the existing tube wells, a scheme for augmenting the supply by constructing another tube well is being pushed through. This tube well along with the new third well should solve the water supply problem of this town.

GHAZIFUR.

Water Supply Maintenance—The waterworks, which was inaugurated last year, has proved to be very popular, but it is feared that it may not be self-supporting owing to the fact that the water supply rules, which were pres-

erbed by Government, have not been followed. A new set of rules were framed by the Board, but as the did not conform with the model water supply rules, they have not yet been sanctioned.

The mechanical plant functioned satisfactorily throughout the year and the supply of water was copious.

With the increase in the number of private connexions and without any proper control on the consumption, it will soon be necessary to duplicate the plant and to erect another tube well.

Water Supply Improvement -A scheme estimated to cost Rs.36,641 for the extension of the distribution system is in hand and the works are expected to be finished early next year. The private connexions on these extensions will be an additional source of income to the Municipal Board.

By the end of the year, 114 private connexions were given and some extension to the distribution system was also carried out from the savings on the scheme.

Water Supply Maintenance -The plant is old and obsolete and no steps have been taken during the year to improve its condition. Even minor repairs have not been carried out due to paucity of funds. The question of ownership of the waterworks has so far not been decided with the result that the plant is not being properly looked after. This town is an important Hindu pilgrimage centre and a potable supply to thousands of pilgrims attending the melas is very important. The plant is on its last legs but the Engineer-in-charge has tried to maintain the supply. The quality of water has also not been up to the standard and nothing has been done by the Board to improve it by installing a small sterilizing plant.

GOLAGOKARAN
NATH.

Water Supply Improvement -A scheme of reorganization is under preparation by this department but it is doubtful whether the local authority will be able to find funds for the renewal of the plant without substantial assistance from Government.

Water Supply Maintenance -An estimate for a trial tube well amounting to Rs.8,162, prepared by the Well Boring Operations Division, has been approved by the Municipal Board on condition that the entire amount is given by Government as a grant-in-aid.

GORAKHPUR.

Drainage Extension, II Instalment (Rs.31,121) -The work was completed in March, 1938 but due to heavy floods during the rains a portion of the retaining wall collapsed. An estimate amounting to Rs.32,834 for its reconstruction has been prepared and supplied to the Municipal Board for sanction.

Drainage, II Instalment (Rs.80,846) -An estimate for further extension of Hardoi Drainage Works and for minimizing the trouble due to flooding was prepared and furnished to the Municipal Board.

HARDOI.

Water Supply Maintenance -No improvements have been effected in this undertaking during the year. Proposals made for improving the supply were not accepted by the Notified Area Committee owing to lack of funds. The quality of water remained as unsatisfactory as before. Supply is not controlled, no waste prevention measures have been introduced and no water tax has been levied with the result that the undertaking is not self-supporting. Night tests are not run properly and the actual quantity of water supplied is not known as bulk supply meters have not been installed on the leading mains; consequently the returns submitted are not reliable.

HALDWANI.

The supply of water from the headworks remains muddy during the monsoon period and the alum dosing plant is not capable of clarifying the water, consequently muddy water is supplied to the town. Revised water supply rules have been framed by the Notified Area Committee, but the advice of this department was not obtained and the rules are not in conformity with the model water supply rules.

This undertaking requires reorganization, but unless water tax is levied and proper water supply rules are enforced, no improvements can be effected.

Water Supply Improvements.—*Revised estimate (Rs.37,025)* A forecast of cost for the filtration and improvement of existing water supply at Haldwani^s was prepared for the consideration of the Committee.

HAPUR

Drainage :—Improvement to certain parts of the town A forecast of cost for the above work prepared by the Executive Engineer, I Division, Public Health Department, has been forwarded to the Municipal Board for their approval.

HARDWAR.

Water Supply Maintenance As the Kumbh Mela was held this year in April, 1938, there was a great demand for drinking water for the big congregation at the time of the Kumbh ; besides this, water was required for automatic flushing of the sanitary conveniences and pail depots as well. The yield from all the four wells was, however, found quite adequate to meet the demand and there was no breakdown in the supply.

It has been noticed that there is some leakage in the underground reservoir at Tibri, although no cracks are visible in the walls or floors. Suitable action to put it right will be taken shortly.

With the commencement of the year, elaborate arrangements had to be made to meet the increased demand in water supply for lakhs of people, who attended the Kumbh Fair held in April, 1938. The water supply was maintained satisfactorily throughout the year, and there was no interruption in the public water supply in spite of the excessive demand. Towards the end of the year, however, two of the three wells at Tibri did not function satisfactorily and this matter is being investigated by the department and if the existing wells cannot be improved by inserting tubes due to the rocky nature of the place, another tube well will have to be constructed to meet the demand.

Waste prevention measures have not been tackled. No new meters have been purchased during the past several years and most of the old meters are unserviceable. This should receive proper attention of the Board.

The staff arrangement remained very unsatisfactory. No qualified Assistant Waterworks Engineer was appointed as recommended. The other staff is also not properly trained and qualified to discharge their duties. The Electrical and Waterworks Engineer due to ill health could not attend to his duties properly and had to go on leave without any proper substitute.

The chlorinating plant at Tibri worked satisfactorily throughout the year, and there was no complaint of bad quality of water.

Drainage and Sewage Farm (Rs.6,19,453) A revised project for Hardwar drainage was sanctioned in 1935 and a sewage farm project was subsequently prepared and technically approved in 1936. But as these two projects were complementary, it was considered desirable to combine them and to obtain the sanction for the combined project. Tenders for the work were called on 6th July, 1936 and the work was taken up for construction in September, 1936.

As the Board could arrange for funds amounting to Rs.5 lakhs only for this work (Rs. 4 lakhs as loan and Rs. 1 lakh as grant from the Government) works to this amount were taken in hand for construction. On account of very keen competition, the tendered rates were exceptionally low and so out of the savings thus effected, it was possible to construct a few sets of water-flushed latrines, urinals and pail depots as well as to cover a very long length of the open channel near the sewage farm and to carry out several other works not originally included in the project.

The work was completed and the sewers began to function long before the Kumbh Mela. After the completion of the work, it was found necessary to carry out some other small works, which were considered necessary to make the scheme efficient in working. These extra works have also been completed and final payment has been made to the contractor.

A small pumping plant is to be provided on the well recently constructed to fill the flushing tank at Kankhal. This work is being carried out on a piece work agreement and will be completed very shortly.

There are several other works which are very essential and are under consideration. There is already a sum of Rs.7,000 as savings and Rs.16,000

have been given as grant, by the Board of Public Health. Tenders for these works will shortly be invited.

Bhimgoda Drainage—As the natural lie of the portion of Hardwar above Bhimgoda is towards the north, it was impossible to connect this area to the main sewer, which begins from the Har-ki-pairi, without pumping. A forecast of cost amounting to Rs.50,000 was prepared but due to lack of funds, the Board was unable to take this work in hand. As the polluted water flows right into the Brahm Kund at the Har-ki-pairi, it is imperative that the Board should take this work up as soon as possible.

Improvements to Har-ki-pairi—A project for the improvement of Har-ki-pairi, Hardwar was prepared and sanctioned in 1932. Out of the works provided therein, the reinforced concrete bridge connecting the Island platform with Jammughat steps was completed and handed over to the Board in 1935.

The remaining works were taken in hand for construction in 1937. Although the tender was accepted in the month of November, 1936, order to start the work could not be given till January, 1937 as the Municipal Board could not acquire the houses to be dismantled earlier. Ordinarily the work was to be completed in two years time, but as the Kumbh fell a year earlier, the time for the execution of the work was very limited. There was great opposition and obstruction from the local Pandas during the construction and it was with the greatest difficulty and hard work that the work could be completed in time. There were several extra works amounting to about Rs.70,000 which were decided to be carried out along with the sanctioned works. The staff of this department was put to a very great strain in completing the works in time for the Kumbh.

The general public desired to provide heavier bells in the clock tower constructed in connexion with this work, as the sound of the existing bells could not be heard from a sufficiently long distance.

One ton steel bells have been ordered for replacing the 6 cwt. bells. The work will be finished shortly.

Improvement to Bhimgoda Road—A portion of the above road near the Har-ki-pairi was very steep and this steep gradient was responsible for many accidents every year. The road has now been cut down and the gradient has been very much improved by changing it from 1 in 10 to 1 in 25.

Fire Fighting Appliance—A devastating fire broke out in Hardwar in the Kumbh Mela and damage to the extent of many thousands of rupees resulted. The Municipal Board was advised to provide suitable fire fighting apparatus but they appear to have taken no action so far.

Water Supply Maintenance—The mechanical plant as well as the distribution system functioned satisfactorily. Some trouble has been experienced in the distribution system owing to a few lengths of pipes being found to be corroded externally. It is suspected that it is due to the chemical reaction of the soil and the matter is being investigated. HATHRAS.

All private connexions at this place are metered and the supply was maintained throughout the twenty-four hours. The number of connexions increased from 421 at the end of last year to 549 by the end of this year.

The tube well which yielded unpotable water was found choked with sand due to its being out of use for a long time. The tube well has been cleared of all the sand and is now yielding potable water.

The staff, although their salaries were reduced considerably, worked well. It is advisable that they should be given benefit of the original grade as otherwise they may try to go elsewhere.

Due to lack of a proper workshop, repairs cannot be carried out satisfactorily. The expenditure on providing a workshop on a small scale would be justified.

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Water Supply Improvement—Chlorinating and Ammoniating Plant—As the results of the analyses of water were not satisfactory, it was decided to install a sterilization plant to improve the quality of water. An estimate amounting to Rs.5,745 was prepared and sanctioned and a grant amounting to half the cost of the estimate was given by the Board of Public Health.

Out of the tenders received for this work, that of Messrs. Candy Filters (India), Ltd., was accepted. It provided a chlorinating and ammoniating plant, the cost of which was much in excess of that included in the original estimate. Consequently the estimate was revised and the cost increased from Rs.5,745 to Rs.13,047.

A house for accommodating the sterilization plant was constructed and the plant installed therein. The chlorinating and ammoniating plant was tested on the 27th January, 1939 and found to be in good running order.

The complete works, comprising machinery and building work, were handed over to the Municipal Board on the 4th February, 1939. Since then no trouble has been experienced regarding the unpotable quality of water.

Drainage—The forecast of cost prepared by this department is under the consideration of the Municipal Board, who have not yet come to any final decision.

The drainage of this town is very unsatisfactory and with the increase in its water supply the conditions are getting worse. The Municipal Board would be well advised to take early steps to improve the drainage of the town.

JAUNPUR.

Water Supply Maintenance—This waterworks undertaking worked satisfactorily throughout the year, although at times the quality of water was bad. The mechanical plant at both the stations including the filtration and the chlorinating plant worked well during the year.

Water Supply Improvement—Various works at an estimated cost of Rs.7,587 were carried out during the year under report, which have effected a great improvement in the waterworks. These included the construction of staff quarters, road watering tanks, mechanical appliances and fittings to the settling and balancing tanks, etc. The number of private metered connexions increased from 238 to 347 during the year. Some extensions to the distribution system have also been carried out from the savings on the main scheme.

The wash-water tank, which was previously in use for washing of the filters only, was connected to the distribution system, thus increasing the storage capacity for filtered water. Two hand pump type standposts were erected, but these did not prove satisfactory because of the poor quality of the fittings used. Twenty-four hours continuous supply was started and the complaint of air passing into the distribution pipes and affecting the meters was removed. If unfiltered water is used as advised by this department for road watering purposes, the cost of filtering it will be saved to the Board.

Drainage—A scheme for the improvement of drainage works at Jaunpur is under preparation. The scheme if carried out will greatly improve the existing drainage system of the town.

JHANSI.

Water Supply Maintenance—The steam pumping plant installed at this place is very old and uneconomical and if a modern steam plant is installed, the maintenance cost would be considerably reduced. The reorganization of this station has, on several occasions, been recommended by the Waterworks and Mechanical Engineer, and a scheme for this reorganization is already in hand. In spite of the plant being obsolete the supply of water was maintained during the year. The quality of water is, however, not satisfactory as only a part of the supply is chlorinated at the city reservoir. The Civil Lines area is still being supplied with unfiltered and unchlorinated water.

Although the staff maintained has been sufficient, the necessity of appointing a qualified pipe line inspector is keenly felt, as the Superintendent has to look after the distribution also in addition to the mechanical plant, which is situated at a distance of about 5 miles from the city. If he is given assistance for the supervision of the distribution work he would be able to devote more time on the maintenance of the plant.

Water Supply Improvement—As desired by the Municipal Board a forecast of cost for the reorganization of the existing Jhansi Water Supply with a view to increase the supply and to provide proper filtration arrangement is under preparation.

Water Supply Maintenance—The water supply could not be maintained satisfactorily during the year. Extensive repairs had to be carried out to the pumping plant on two or three occasions and as the plant is not in duplicate the public water supply was interrupted for several hours on each occasion. KOSI.

Attention of the Board has been repeatedly invited to the necessity of duplicating the plant and if this is not done at an early date, a serious situation may arise, when a complete shut down of the public supply for a long period will have to be faced.

The tube well, which was reported to be showing signs of deterioration in its yield is in fact giving sufficient quantity of water and it will probably not be necessary to duplicate it for some time. The storage capacity of the system will, however, have to be increased and the plant duplicated.

The unaccounted for water was very satisfactory and this is because all the private connexions are metered.

The staff besides being meagre is mostly illiterate. The Waterworks Superintendent is the only man who is capable but he cannot be expected to do all the work himself. He should be given proper assistance and other facilities.

Water Supply Improvement (Rs.77,000)—This is a small town in the Garhwal Government Estates. Though the population is small, yet, as the forces stationed at Lansdowne pass through this town, it is considered to be a fairly important place. The only source of supply at present is the canal flowing through the town. For the past several years, endeavours have been made to provide a piped water supply, but for want of funds the proposals did not mature. The Deputy Commissioner, Garhwal, has this year again made an attempt to push through the work. A project has been prepared and he has been able to arrange for some funds from the Estate inhabitants and other sources. If the Board of Public Health contribute something towards this scheme it is hoped that the work will be taken in hand for construction in the near future. KOTDWARA.

The source of supply is from Riggadi spring, situated at a distance of about $5\frac{1}{2}$ miles from the town. *En route*, the pipe line will supply water to as many as five villages also, as there is no drinking water available at present there and the people have to bring it from long distances.

Lucknow Water Supply Maintenance—The pumping plant at both the filtered and the unfiltered stations worked without any serious breakdown during the year, but scarcity of water especially in summer still prevails in several localities. Due to construction of the trunk main, some relief was afforded to some of the inhabitants, but permanent relief cannot be given unless waste is vigorously controlled. The installation of meters as permitted by the bye-laws would have a more salutary effect in checking waste than the issue of warning notices which in most cases is ineffective. LUCKNOW.

During the year 649 private connexions were added and 38 standposts were erected, bringing the total number of the private connexions from 16,516 to 17,071 and of the standposts from 820 to 858.

It is understood that the financial position has deteriorated and the maintenance charges have increased while the income is not increasing in the same proportion.

Water Supply Improvement—The work of installation of the fourth pump at Aishbagh has not yet been taken up although the loan was made available in the month of November, 1938.

Drainage—The drainage of the town continues to be unsatisfactory. The pumping plant at the sewage pumping station is in a precarious condition and the Board have taken no steps to replace the units by chokeless pumps as advised by the department.

Repairing Breach in and Replacement of the W. I. Sewer—(Estimated cost of replacement Rs.2,96,429 and repairs Rs.19,942).—The Western Intercepting sewer near the Sewage Pumping station having got breached, the department was requested to prepare an estimate for its reconstruction. Two alternative proposals were submitted, one for reconstructing the breached section only and the other for realigning and reconstructing the whole length.

The breached sewer continued to be a source of danger to the bund during the year under review.

Anti-Malaria and Drainage Works (Estimated cost Rs.7,746)—The works were maintained departmentally. The Government House section of the lining was treated with a special preparation "Tricosal" to render the lining water-tight against subsoil water seepage. Necessary repairs to certain lengths of the lining, which sank, were also carried out.

Rehabilitating G. H. Canal Sewer. (Rs.3,97,286)—As the existing G. H. Canal Sewer is overloaded the Government desired a scheme to be prepared for relieving this sewer with a view to admit the sewage of the rapidly developing Improvement Trust areas along the Canal. Proposals for the construction of a parallel sewer were prepared and submitted for the approval of Government.

Maintenance of Gomti Weir (Rs.3,531) The weir was maintained satisfactorily throughout the year and necessary repairs were carried out.

MEERUT

Water Supply Maintenance The condition of this undertaking remained as bad as reported previously. The turbines are extremely old and costly to maintain. The standby plant is uneconomical and inefficient to cope with the supply when the canal is closed.

The Board has not so far metered or provided a separate rider main for the 75 connexions taken from the rising main. There is no water tax and the much needed improvements and extensions cannot be carried out for want of funds. The Waterworks Superintendent tries to do his best to maintain the supply in spite of the age of the plant. The question of appointment of an additional pipe line inspector has been under consideration for several years and although the man, who has been occupying this post, is old and incapable, the Board has not yet replaced him or appointed an additional man as recommended.

Water Supply Improvement—No development has taken place since the preparation of the forecast of cost, referred to in last year's report, which is probably still under the consideration of the Municipal Board.

MIRZAPUR.

Water Supply Maintenance—No improvements have been carried out in the water supply of the town during the year and the supply remains as unsatisfactory as ever. The quality of water has been reported to be very unsatisfactory.

No waste prevention measures have been adopted and the night tests have not been conducted. The few meters that have been installed have not been looked after properly.

Although no water tax is imposed, the undertaking is a profit-earning concern, but the savings are not sufficient to meet the cost of a suitable scheme of reorganization. The Municipal Board should impose a water tax and take necessary loan from Government for improving their water supply.

Water Supply Improvement—Proposals for the extension and improvement of the distribution system and for the installation of filters have not been taken up for want of funds.

MOGHAL SARAI.

Water Supply Improvement (Rs.36,828)—The detailed project for new waterworks comprising pumping plant, elevated reservoir, distribution mains and standposts, etc. which was submitted to the Notified Area in the year 1937-38, has been sanctioned by the Board of Public Health. The preparation of the specifications and tender forms has been taken in hand.

MORADABAD.

Water Supply Maintenance—This undertaking is under the management of Messrs. Noorullah Ghazanfarulla who are the licensees of the undertaking. The waterworks were inaugurated a few years ago and about 339 private

connexions have been given so far. The question of the quality of water is being investigated and if the quality of water is found to be unsatisfactory, recommendations for installing a chlorinating plant will be made.

Water Supply Maintenance—The working of the waterworks was satisfactory throughout the year under report. There was no breakdown in the pumping plant or in the distribution system. Owing to the effective control of water supply distribution system and the waste prevention measures adopted, a considerable quantity of water was saved and utilized for other services. MUSSOORIE.

Hydro-electric Undertaking—The plant at Galogi and Kaulagath stations were well maintained during the year and no major repairs were found to be necessary. The central workshop at Dehra Dun continued to give satisfactory service.

A new Diesel set of about 750 K. V. A. has recently been added at Dehra Dun but it has not yet been officially tested and taken over.

Water Supply Maintenance—The pumping plant at the main pumping station and tube well no. 5 continued to give satisfactory service. MUTTRA.

The Diesel engines, generators and the D. C. pumping plant are proposed to be replaced by another A. C. set of an improved type. This work has been included in the reorganization scheme. All the tube wells yielded satisfactory supply of water.

To meet the demand of a newly built up area another tube well and pumping plant have been proposed to be installed and to obviate complaints of shortage in high zones, provision for boosting sets has been made.

Some action has also been taken to tackle waste, but the results are not quite satisfactory. The private house connexions and public standposts have increased during the year by 172 and 12 respectively.

Water Supply Improvement—The fair project for the reorganization of the water supply was approved by the Municipal Board, and submitted to the Board of Public Health for administrative approval and for recommending it to Government for loan. The project has been administratively approved by the Board of Public Health and the Board's loan application is under the consideration of Government.

A detailed estimate amounting to Rs.9,159 was prepared by the Executive Engineer, Well Boring Operations Division, Public Health Department, Cawnpore, at the request of the Executive Engineer, I Division, Public Health Department, Meerut, who prepared the project for Muttra Water Supply Reorganization. The project has been sanctioned and the preparation of the specifications and tender forms is in hand.

Drainage Maintenance—The sewage pumping station has not been worked properly, as pumping hours are fixed to suit the convenience of the tenants at the sewage farm, with the result that the sewage backs up in the sewers. This system should be altered, as otherwise the whole drainage system will get choked and considerable expenditure will have to be incurred on desilting operations.

48" Storm Water Drain at Antapara—The work was started on 15th June, 1938, and most of the work was completed by the end of March, 1939. The Municipal Board desired to utilize the savings, which accrued due to low tendered rates in constructing a 20" semi-circular drain from the tail end of the 48" storm water sewer and another 12" semi-circular drain from the ice factory to the tail end of the 48" storm water sewer. The Board agreed to provide half of the excess over the estimate from their own resources and for the remaining half approached the Board of Public Health for a grant-in-aid. The Board of Public Health sanctioned the revised estimate amounting to Rs.24,632 and at the same time sanctioned a further grant of Rs.2,595-8 also. Due to these additional works, the period for the completion of the works was extended up to 31st March, 1939, by which date the works were expected to be completed and handed over to the Municipal Board in good running order. For want of good kankar, however, the design of the road was changed and it was proposed to be constructed of blue stone ballast and painted. The collection and consolidation

of the metal has been done and the painting will be done some time in April or the beginning of May, 1939 and all the works are expected to be completed by the middle of May, 1939.

48" Storm Water Sewer, Antapara, Supplementary Estimate (Rs.6,840). -

A supplementary estimate to provide for a retaining wall with a parapet along the 12' semi-circular drain recently constructed in Bhains-Bhora, where the drain is in deep cutting, has been prepared and furnished to the Municipal Board for sanction.

Dig Darwaza Drainage—The Municipal Board have also requested for the preparation of a detailed project for the drainage of Dig Darwaza locality. Necessary surveying and levelling have been carried out and the project has been nearly completed.

NAINI TAL.

Water Supply Maintenance—The pumping plant functioned satisfactorily during the year.

The new electrolytic chlorinating plant erected last year has not been giving satisfactory service and the matter is under investigation.

Practically nothing has been done to prevent waste on the public stand posts. The Board's Engineer was requested to follow the practice adopted in this connexion at Mussoorie, by visiting the place and studying the methods adopted there. The question of skilled labour remains as difficult as it was before, because trained men are not available in the locality and sufficiently attractive remuneration is not offered to competent men coming from outside the district.

Hydro-electric Supply Maintenance—Further investigations made of the hill sides of Naini Tal show that the Hydro-electric Station may have to be closed in case of a severe hill slide and both the water supply and the electric supply of the town may be cut off. The Board would be well advised to come to a decision regarding the erection of a subsidiary power station at as early a date as possible.

The staff at the Hydro-electric Station is incapable of carrying out any repair work. A competent Power House Superintendent should be appointed to look after the station.

ORAI.

Water Supply Improvement (Rs.92,610)—This estimate has been prepared at the request of the Chairman, Municipal Board, Orai. It is proposed to supply water to the whole of the town except the Civil Lines. The pumping plant will consist of an oil engine driven borehole pump to be fitted in the tube well already constructed. The supply will be about 10 gallons per head per day. The preparation of the contract documents is in hand and the work of construction will be taken up shortly.

S AHSAN,
DISTRICT
ETAWAH,

Improving yield of well at police station, district Etawah (Rs.2,994)—The kachcha well at Sahson has been lined with masonry both at the top and at the bottom. The well cylinder has been sunk 16 feet below water level. 6" x 4" boring was carried down to 212 feet below ground level and a 2½" tube well has been installed therein. The work has been completed and handed over to the police authorities.

UNAO.

Water Supply Maintenance—The waterworks continued to function satisfactorily during the year in spite of the decrease in the yield of water from the tube wells. Water supply was maintained throughout the twenty-four hours and in sufficient quantity with adequate pressure.

This undertaking has been well managed and waste has been reduced to a minimum. A survey of the distribution system reveals that there are no leaky taps and standposts. Some of the bigger municipalities should follow the example of this municipality in the management of their water supply undertakings.

Drainage Maintenance—The existing underground drainage system serves only a limited area and in order to utilize the pumping plant and the farm to the full extent, it is necessary for the Board to carry out the second instalment of the drainage scheme. The pumping plant worked satisfactorily but the effluent cannot reach the sewage farm as the quantity is very small.

MISCELLANEOUS WORKS.

Advice has been given to several Government departments on matters which come within the scope of this department's activities. Free advice on numerous matters has also been tendered to many of the local authorities. In some cases the sites were inspected and forecasts of cost prepared.

The Superintending Engineer has also advised the Board of Public Health on proposals and projects for health works to an aggregate value of Rs.71.62 lakhs during the year under report.

H. G. TRIVEDI,

A.M. INST. C.E., A.M.I.E. (INDIA),

Superintending Engineer,

Public Health Department,

United Provinces.

LUCKNOW :

The 6th October, 1939.

RAJASTHAN
OF 111
38.
Received

FORTY-THIRD ANNUAL REPORT

OF THE

SUPERINTENDING ENGINEER

PUBLIC HEALTH ENGINEERING DEPARTMENT

UNITED PROVINCES

FOR THE YEAR ENDED MARCH 31, 1938

24/1/39



ALLAHABAD:
SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES, INDIA
1939

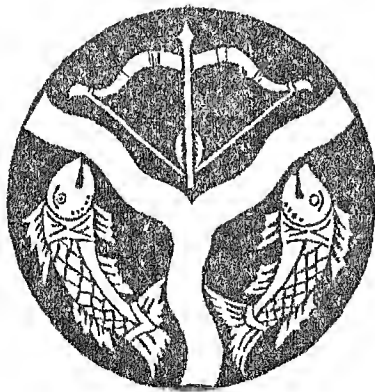
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FORTY-THIRD ANNUAL REPORT
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SUPERINTENDING ENGINEER
PUBLIC HEALTH ENGINEERING DEPARTMENT
UNITED PROVINCES

FOR THE YEAR ENDED MARCH 31, 1938



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SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES, INDIA
1939

**FORTY-THIRD ANNUAL REPORT OF THE SUPERINTENDING
ENGINEER, PUBLIC HEALTH ENGINEERING DEPARTMENT,
UNITED PROVINCES, FOR THE YEAR ENDED 31st MARCH.
1938.**

The table below shows the extent of the duties undertaken by this Department during the year under review :

Item number	Nature of work	Amount involved in lakhs of rupees	Remarks																												
1	Duties under the Local Authorities Loans Act, 1911, and the Municipalities Act, 1916, i.e., the supervision and inspection of all open waterworks, drainage pumping stations and hydro electric supplies	75.53	This amount represents the turnover in revenue and expenditure on water supplies, drainage pumping stations, sewage farms and hydro-electric supplies and is made up as follows : <table> <tr> <th></th><th>Revenue</th><th>Expenditure</th><th>Total</th></tr> <tr> <th></th><th>Rs.</th><th>Rs.</th><th>Rs.</th></tr> <tr> <td>Water-works,</td><td>30,52,115</td><td>28,13,931</td><td>58,66,046</td></tr> <tr> <td>Drainage pumping stations</td><td>.</td><td>2,91,052</td><td>2,91,052</td></tr> <tr> <td>Sewage farms</td><td>61,193</td><td>24,514</td><td>85,707</td></tr> <tr> <td>Hydro-electric supplies</td><td>7,18,897*</td><td>5,91,657*</td><td>13,10,554*</td></tr> <tr> <td>Total</td><td>38,32,205</td><td>37,21,154</td><td>75,53,359</td></tr> </table>		Revenue	Expenditure	Total		Rs.	Rs.	Rs.	Water-works,	30,52,115	28,13,931	58,66,046	Drainage pumping stations	.	2,91,052	2,91,052	Sewage farms	61,193	24,514	85,707	Hydro-electric supplies	7,18,897*	5,91,657*	13,10,554*	Total	38,32,205	37,21,154	75,53,359
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2	Local works—																														
	(a) Preparation of projects .	10.98	16 detailed proposals.																												
	(b) Construction ..	7.45	Payments made.																												
3	Provincial works—																														
	(i) Miscellaneous—																														
	(a) Preparation of projects	0.72	13 detailed projects.																												
	(b) Construction .	0.68	Payments made.																												
	(c) Maintenance ..	0.13	Lucknow Gomti Weir, Ghaziuddin Hyder Canal Anti-Malarial Works, Allahabad M.gh Mela and Executive Engineer, I and II Divisions offices and residence maintenance.																												
	(ii) Allahabad District Public Works Department works—																														
	(a) Preparation of projects	7.20	72 detailed projects.																												
	(b) Construction ..	1.81	Payments made.																												
	(c) Maintenance ..	1.81																													
4	(a) Advice free to local authorities..	29.09	20 forecasts of cost with reports furnished.																												
	(b) Advice free to Government departments.	0.06	2 forecasts of cost with reports supplied free.																												
5	Board of Public Health business—																														
	(a) Examination of projects for urban works.	45.72	29 projects and 13 forecasts of cost with reports supplied free.																												
	(b) Examination of projects for rural sanitation.	1.78	433 projects were scrutinized.																												

*This figure includes revenue and expenditure for Hardwar electric supply.

Item number	Name of work	Amount involved in lakhs of rupees	Remarks
	(c) Checking progress on urban and rural areas works, G. O. nos. 463/XI, dated the 6th February, 1931, 470/XI, dated the 6th February, 1931, 580/XI, dated the 11th February, 1931, and 490/XI, dated the 9th April, 1931.	1.07	Progress report collected and consolidated for the Accountant General United Province.
6	Examination of projects for Provincial works.	8.57	28 projects were examined.
7	Inspection and reports on works carried out by local bodies.	1.90	
8	Scrutiny of certain municipal budgets, G. O. no. 4718/XI-10 H, dated the 6th January, 1933	74.00	This represents the total figures of original budget schedules of income and expenditure of local authorities in towns possessing piped water supplies, drainage pumping stations, and hydro-electric supplies.

N B—The figures for the Allahabad District Public Works Department works have also been supplied to the Chief Engineer, Public Works Department, Buildings and Roads Branch, for inclusion in his annual report as required by Public Works Department, Buildings and Roads Branch, G. O. no. 957/MS/217/MS—252, dated the 7th December, 1933.

2. The expenditure on works carried out by the Department during the year amounted to Rs. 11.89. The total value of works for which projects including preliminary proposals and forecasts of cost were framed amounted to Rs. 48.05 in the year.

FEES AND REALIZATIONS.

3. A total amount of Rs. 67,029 was earned in fees for works carried out for local authorities. These fees are levied in accordance with Government orders only on the duties undertaken under item 2 of the table above. The fees earned on the supervision of construction amounted to Rs. 57,991, while the fees earned on the preparation of projects amounted to Rs. 9,035 making up the total referred to above.

In addition to the above fees a sum of Rs. 1,029 was recovered for hire of tools and plant from contractors. A further sum of Rs. 780 was realized as supervision charges on the value of works carried out in the workshops of the Well Boring Operations Division, Cawnpore.

BUDGETS OF LOCAL AUTHORITIES.

4. The budget schedules of the local authorities received in this office show that a total turnover of Rs. 74.00 lakhs took place during the year under the head revenue and expenditure incurred on piped water supplies, hydro-electric supplies and drainage pumping stations. Those municipalities who provided piped water supply incurred a total expenditure of Rs. 54.10 lakhs on these supplies during the year.

WATER SUPPLY

NUMBER OF UNDERTAKINGS

5. There are now 25 public water supply undertakings in the province as against 12 in 1920. The number has increased by one during the year under review.

Twenty-three of the undertakings are managed by the local authorities and two, Aligarh and Moradabad, by licensed undertakers as permitted by the amendment to the Municipal Act of October 28, 1933. The number of municipal hydro-electric undertakings, viz., two, remains the same as last year. The capital invested in the waterworks controlled by local authorities now amounts to Rs. 3.32 crores.

POPULATION SERVED AND COST OF SUPPLY.

6. A total urban population of 1,643,073 is served by the undertakings; 1,543,073 by the concerns administered by local authorities and 100,000 by the two undertakings managed by licensees. The average daily supply amounted to 44.082 million gallons and the maximum average in any one month to 50.753 million gallons. The total consumption was 41.05 gallons per head per day at Cawnpore, the highest in the province and 3.10 gallons at Jaunpur, the lowest. The cost per thousand gallons of water supplied amounted to

0.93 annas at Meerut, the capital charges having been liquidated, and to 3.81, 2.91, 1.79, 1.77 2.65 annas respectively at Agra, Allahabad, Benares, Cawnpore and Lucknow. The total cost per thousand gallons at Mussoorie, which is the highest in the province, amounted to 23.65 annas.

7. The following boards managed to run their waterworks at a profit : Allahabad, Cawnpore, Lucknow, Meerut, Naini Tal, Dehra Dun, Jhansi Mirzapur, Muttra, Hardwar and Kosi. Lucknow showed a small profit, but if payments outstanding, as they stood at the close of the financial year amounting to Rs.16,093, had been taken into account, there would have been a small deficit. Deficits were also incurred at Agra, Benares, Mussoorie, Fyzabad, Unao, Fatehpur Sikri, Almora Gola Gokuan Nath, Haldwani, Hathras and Jaunpur. Taking the financial position as a whole, there was a profit on the year's working of Rs.2,5184. But during the year an amount of Rs.2,15,491 was incurred on capital works and the cost met from revenue. If this is taken into account the gross profit on all the undertakings managed by the local authorities will amount to Rs.4,53,675.

PROFIT AND
LOSS.

8. The mechanical plant at most of the waterworks, according to the reports of the Waterworks and Mechanical Engineer, has on the whole been satisfactorily maintained, but unfortunately this is not the case with the distribution systems the management which leaves much to be desired. In a good many towns the records have not been correctly maintained, and in some conditions are chaotic. Extensions are usually carried out haphazardly and branch mains overloaded with numerous connections instead of duplicate mains being laid. The distribution systems in most of the large towns are out of date and require reorganization. But until waste is properly tackled and reduced, the relief would only be temporary and the old conditions would resume after the expiration of a few years.

MAINTENANCE
OF THE
MECHANICAL
PLANT AND
DISTRIBUTION
SYSTEMS.

9. Waste prevention measures have been taken up in all the towns and government have issued orders that periodic night tests have to be carried out and returns submitted showing the measures taken to check and prevent waste. The pipeline staff in all the large towns have been greatly augmented but it is extremely doubtful if the results obtained up to date have been commensurate with the expenditure incurred. There appears to be far too many supervisors, and too few operators who can use their hands, that is, competent to undertake minor repair works such as re-washing taps, changing meters and replacing taps on public standposts. The boards would be well advised to overhaul their pipeline staff and dispense with the services of persons who are not competent to carry out minor repair works without the aid of a mistry.

WASTE
PREVENTION
MEASURES.

10. Not much progress has been made in regard to the installation of water meters. The Allahabad Board has recently placed an order for a number of meters and the Chairman is taking steps to organize a special metering department which is a step in the right direction. Lucknow Board after a period of nearly two years have at last taken steps to utilize the loan of Rs.50,000 given them for this purpose. The Benares Board have gone to the other extreme and have issued order for all the meters installed, even in cases where they had been imposed under the powers vested in the Executive Officer, to be removed.

METERED
SUPPLIES AND
CONTROL.

11. As remarked in last year's report, the acid test of the successful management of a waterworks undertaking is the percentage of water that can be "accounted for". This should be in the region of 90 per cent., and more in the case of the smaller towns. Applying this test to the waterworks undertakings in this province, small towns like Unao, Hathras and Kosi which have acted on the advice of this department can account for 90.06, 94.60 and 98.38 per cent. respectively of the total water supplied. While the larger towns, e.g., Lucknow, Cawnpore and Allahabad can only account for 60.03, 39.60 and 41.40 per cent. respectively.

MANAGEMENT.

12. Shortage of water in the outlying districts of all the large towns still persists. Cawnpore is embarking on a huge scheme of water supply reorganization and Lucknow has approved a programme of capital expenditure amounting to many lakhs of rupees. This expenditure, however, will be of little avail unless the by-laws are more rigorously enforced and misuse of water is prevented.

SHORTAGE OF
WATER IN
THE LARGE
TOWNS.

**WATERWORKS
STAFF.**

13. The difficulty reported in previous reports regarding the recruitment of suitable technical staff for the maintenance of the waterworks both for the superior and subordinate posts still remains. There are many candidates forthcoming with the academic qualifications specified but nearly all lack practical experience. With one or two exceptions the superintendents of the smaller undertakings are not willing to undertake any manual work themselves and maintenance costs are increased by the employment of mistress and menial staff to undertake work which in the normal course should be done by the superintendent.

**WATER LAW
AND THE
MODEL
BYLAWS.**

14. The water supply clauses in the Municipalities Act and the model rules made thereunder are based on the practice prevalent in the United Kingdom some 50 years ago and badly need revision. Many other matters in connection with the administration of the water undertakings also require investigation. It is understood that Government propose appointing an expert committee to inquire into these matters and to make recommendations. The approval and adoption of a standard specification for water pipes and fittings throughout the province will also come within the terms of reference of the advisory committee.

DRAINAGE**SEWAGE
PUMPING
STATIONS.**

15. The number of sewage pumping stations remains the same as last year. Two new stations under construction at Peralghat (Cawnpore) and Hardwar are rapidly nearing completion.

**DRAINAGE
CONDITIONS.**

16. No improvement has taken place in the drainage conditions in the large towns in the plains. No action has been taken on the recommendations of the Lucknow Drainage Inquiry Committee and a complete breakdown of the Lucknow Drainage System is inevitable sooner or later. The pumps at the sewage pumping station are worn out and no funds are forthcoming for their replacement. Cawnpore has developed to such an extent that the existing drainage system is badly overloaded. Here the raw sewage is discharged direct into the river Ganges without any preliminary treatment and pollution of this holy river will become intensified when the reorganization and extension of the waterworks is completed. The pollution of the river front at Benares still continues and conditions although slightly alleviated by the construction of a small pumping station at Agra are still very bad. The Allahabad Board is taking steps to duplicate the rising main to the sewage farm and to extend their farm.

**SEWAGE
PURIFICATION.**

17. Sewage purification in the towns having underground sewers is confined to land treatment and providing there is a sufficient area available this gives good results. However, with the big increase in water consumption in all the large cities and the consequent increase in the volume of sewage, there is considerable doubt if this method of treatment can now be relied upon to deal adequately with the dry weather flow. On the average an acre of land is usually required to purify 5,000 gallons of sewage per day, but if the land is under cultivation, there are lengthy periods when irrigation is not required and the sewage has to be disposed of elsewhere or passed into the river untreated. This difficulty can be overcome by keeping in reserve sufficient land to be brought into use for treatment when the cultivators' demands have been satisfied but the extent of the sewage farm is considerably increased as one-third of the total area should be set aside for this purpose. Assuming the quantity of sewage to be dealt with is 5,000,000 gallons per day, an area of something like 1,500 acres will be required to treat this effectively. The land in most parts of the province is certainly crying out for more water but the huge areas required for sewage treatment are not always available on the fringe of the large cities and it would appear that in the near future the sewage farms will have to be supplemented by some form of artificial treatment.

DEVELOPMENTS

18. The major portion of the Hardwar Drainage Scheme was completed during the year in time for the Kumbh Mela. The scheme was not scheduled to be completed until December, 1938, and much credit is due to Messrs. Trivedi and Ulfat Rai, the Executive Engineer and Assistant Engineer and also the contractor Messrs. Rai Bahadur Seth Chandi Ram Verhomal Doulatani for the rapid progress.

Properly laid out sewage farms are now in operation at Lucknow, Allahabad, Muttra, Dehra Dun and Hardwar, and all are revenue producing. The sewage farms at Lucknow and Allahabad are overloaded and the farm at Muttra is worked more for the benefit of the cultivators than as a means of purifying the town's sewage.

There is now a demand in the large towns particularly in Lucknow and Cawnpore for the installation of sanitary fittings. This unfortunately in a good many cases cannot be met for want of sewers and the intermittent water supply available is also a deterrent.

GENERAL REMARKS

19. Progress in health works, other than water supply and drainage, such as the provision of hospitals, markets, model lodging houses, dispensaries, town planning (other than schemes executed by Improvement Trusts) and the like is slow.

HEALTH WORKS
OTHER THAN
DRAINAGE
AND WATER
SUPPLIES.

Hospital accommodation for infectious diseases in most towns is deficient. Some of the boards, however, are showing more interest in this subject and the Board of Public Health have had applications from the following towns for grants-in-aid for the provision of new building or for extensions to existing premises : Allahabad, Bareilly, Lucknow, Muttra and Gorakhpur. Finance, however, is the stumbling block. Grants from Government in these days of financial stringency are meagre and the boards are reluctant to take loans for such amenities which besides being costly in the first instance, also involve heavy recurring expenditure in their maintenance.

20. Government some time ago circularized the boards drawing attention to their duties under section 7(1)(p) of the Municipalities Act, viz., rendering assistance in extinguishing fires and protecting life and property when fires occur. The boards were also instructed to approach this department for advice on the subject. The following boards applied for advice under the terms of the Government order :—

FIRE FIGHTING
APPLIANCES.

Partabgarh, Sultanpur, Rae Bareilly, Sitapur, Baraut, Atrauli, Azamgarh, Lakhimpur, Mainpuri, Sikandra Rao, Etah, Orai, Lalitpur, Brindaban, Firozabad, Chhazibad, Gorakhpur, Hapur, Etawah, Chandausi, Bara Banki, Soran, Ballia, and Jalesar.

In the majority of towns no piped water supply was available and the level of the water in the open wells was such as to preclude the use of pumped water as a means of extinguishing fires. The only alternative was, therefore, in most cases to recommend the purchase of chemical fire engines to operate along with a tender equipped with fire fighting appliances such as fire buckets, axes, crowbars and the like.

Most of the large towns in the plains having piped water supplies have properly equipped fire brigades but are handicapped by an intermittent water supply and lack of overhead and underground storage. A 24 hours continuous water supply, apart from other advantages, such as the prevention of contamination and convenience to the public, would be justified for this reason alone.

A devastating fire broke out at Hardwar during the Kumbh Mela and damage to the extent of many thousands of rupees resulted. A grave danger of conflagration exists at all the important melas as many thousands of pilgrims are housed in thatched huts and trained fire fighting personnel with suitable equipment should be available to cope with all outbreaks. A recommendation to this effect has been made to Government.

21. The demand for better housing conditions amongst all classes continues. The Improvement Trusts of Lucknow, Cawnpore and Allahabad are meeting this in regard to laying out sites for the erection of houses for the middle classes but apart from Cawnpore little progress is being made in providing housing accommodation for the working classes. It is, however, understood in new schemes which are being framed that due consideration is being given to the matter by the Lucknow and Allahabad Trusts. There is a tendency now common in all countries for the rural population to drift to the towns. It is estimated that the population of Agra is increasing at the rate of 5,000 per annum and the next census will reveal a tremendous influx to the population of Cawnpore. All these factors add to the responsibilities of the boards, and the provision of water mains, drains and sewers in all the towns has not progressed at the same rate as the building developments which are now taking place.

HOUSING
CONDITIONS.

22. The post of Superintending Engineer, Public Health Department was held throughout the year 1937-38 by the writer, Mr. F. D. Tunnicliffe.

STAFF.

The post of Personal Assistant was held by Mr. K. Chattopadhyaya up to 7th May, 1937, when he was relieved by Mr. S. G. Naravane who continued in the office for the remainder of the year. This officer also acted as Secretary, Board of Public Health, vice Mr. Chattopadhyaya, with effect from the 8th May, 1937.

The post of Waterworks and Mechanical Engineer was held by Mr. C.W. Cassé from the 1st to 4th April, 1937, and then from the 25th October, 1937 until the end of the year under review. During his absence on leave his duties were performed by Mr. F. D. Tummeliffe, Superintending Engineer, assisted by Mr. N. R. Gupta, Assistant Engineer (Mechanical).

The post of Assistant Engineer (Mechanical) was held by Mr. N. R. Gupta up to the 2nd January, 1938, when he proceeded on 2 months' leave and then again from 3rd March to the end of the year. During his absence Mr. N. Dayal officiated in addition to performing his own duties as permanent Mechanical Overseer.

Mr. H. G. Trivedi continued as Executive Engineer, 1st Division, Public Health Department, Meerut, throughout the year.

Mr. S. G. Naravane held the office of Executive Engineer, 2nd Division, Public Health Department, Allahabad up to 7th May, 1937, when he was transferred to Lucknow to fill the post of Personal Assistant to the Superintending Engineer, vice Mr. K. Chattopadhyaya who was posted to Allahabad as Executive Engineer, 2nd Division, which office he held for the remainder of the year.

Mr. N. D. Choudhury continued as Executive Engineer, Well Boring Operations Division, Cawnpore, up to 8th March, 1938, when he proceeded on leave, the charge being taken over by Mr. Syed Maqbul Husain, Assistant Engineer, who continued in the office for the rest of the year.

In addition to the staff enumerated above one permanent Assistant Engineer and five temporary assistants including an assistant sanctioned for the Allahabad District Public Works Department work, 9 overseers, 12 temporary subordinates and the requisite number of computers, draughtsmen and clerks were employed.

The staff of the Department has rendered assistance to the Thomason Civil Engineering College, Roorkee, the Lucknow University and the Registrar, Departmental Examinations, Allahabad, as examiners and lecturers on engineering subjects.

The Superintending Engineer also served on the Lucknow Drainage Inquiry Committee.

The staff with few exceptions have striven hard to meet the demand made on them and many of them have had to forego leave and to work overtime to keep abreast with the work.

The Department is seriously understaffed and arrears of work are steadily accumulating and important schemes are being delayed. Many of the temporary staff have put in long years of service and recommendations have been made to Government for the confirmation in the permanent cadre of those who have put in 10 years of approved service. Orders of Government have, however, not yet been issued. The claims of deserving members of the temporary cadre for confirmation have been recommended. Such action would induce a better type of man to seek employment in the Department. As things are, the staff of the Department is in a state of transition, people always coming and going and this state of affairs does not conduce to efficiency.

ACTIVITIES OF LOCAL AUTHORITIES

AGRA.

Water supply—The Board's management of their waterworks is still open to criticism, especially in matters relating to staff appointments. The shortage of water in outlying areas is becoming more acute and the Board are not in a position to fulfil their statutory obligations to the public except in the low lying areas of the city. The metering scheme which was expected to reduce considerably the percentage of waste has been abandoned in spite of protests from this Department.

The controversy regarding the confirmation of certain members of the superior staff has at last been settled and the persons concerned confirmed.

The shortage of water at the Mental Hospital at Billochpura has been overcome to some extent by the Board installing electro motor booster pumps but even now the supply cannot be said to be entirely adequate.

Maintenance of Pumping Plant—The inspection reports of the Waterworks and Mechanical Engineer disclosed that most of the plant is very old and a portion of it is on its last legs. Sooner or later a breakdown is inevitable. The Board have, however, taken steps to purchase spare parts as far as practicable and it is hoped that it will be possible to keep the plant functioning until the re-organization scheme, now under preparation, is completed.

A forecast of cost amounting to Rs 11,33,000 has been presented to the Board for the re-organization of the waterworks and the replacement of the existing pumping plant by larger and more modern units.

Drainage—There is little improvement to record in the drainage conditions. The Board have installed a small pump to deal with a small percentage of the flow which was flowing direct into the river. But the big problem, that is, the contamination of the bathing ghats situated along the river bank and the collection of sewage in the vicinity of the Fort still remains to be dealt with. Drainage conditions in most parts of the city are primitive in the extreme and badly require overhauling.

The waterworks are under the management of the licensees, Messrs. Noorulla Ghazanfarulla of Allahabad. The supply is sufficient and adequate pressures are maintained. All private connections which now number 781 have been metered. Water is supplied during certain hours in the morning and evening through about 92 standposts to the public. There have been complaints from the Provincial Hygiene Institute regarding the quality of water supplied, in that on several occasions it has not come up to the standard prescribed by the Director and Superintending Engineer, Public Health Department. The licensees have been asked to instal a chlorinator and to this they have agreed. ALIGARH.

Drainage—There is no improvement to record in the drainage conditions. Many of the street drains are of an antiquated pattern and require replacing. The disposal of the sewage is also open to objection in that it is not treated on properly laid out sewage farms, but meanders by devious channels to the low lying areas on the fringe of the town and is used haphazardly by those cultivators whose plots abut on the nullahs in which the sewage collects.

Water Supply—The undertaking is practically in the same condition as noted in last year's report. Two new tube wells constructed in the Civil Lines have, however, been brought into commission and these should relieve to some extent the scarcity in the Katra Colonelganj and University areas. Much, however, remains to be done to relieve the scarcity in the outlying districts and to assure an adequate supply to the new areas now under development by the Improvement Trust. The Board, however, is becoming alive to its responsibilities and the Chairman Mr. R. N. Basu is reviewing the whole problem and has approached this Department for assistance. The balance of a loan of Rs.50,000 given for waste prevention measures has been utilized in the purchase of meters and a special metering section is being organized to instal and maintain the meters. ALLAHABAD.

Maintenance of Pumping Plant—The mechanical plant both at the filtered and unfiltered stations has been maintained in a satisfactory condition. The output of the filtered water pumps at Khusrubagh has been the subject of an inquiry by the Mechanical Engineer. The pumps are not giving their rated discharge and are not worked economically. Their replacement or remodelling would result in a considerable saving in recurring charges. Khusrubagh

Temporary Water Supply to the Daraganj Area—At the request of the board, the Executive Engineer, Well Boring Operations Division, arranged for a supply to this area from the Magh Mela tube well during the hot weather of 1937 for a period of two months at a cost of Rs.1,986. This, however, is a make-shift arrangement and the board would be well advised to make permanent arrangement to meet the scarcity on the lines advised by the Waterworks and Mechanical Engineer.

Water Supply Extensions—Provision of two tube wells with pumping plant in the Civil Lines (Rs.71,742). This work was completed during the year under the supervision of the Well Boring Operations Division, Public Health Engineering Department. Trouble was experienced with the motors which did not stand up to the specified conditions. These were removed and replaced at the expense of the contractors, Messrs. Harland Engineering Co. of Calcutta.

Drainage—The conditions are the same as noted in last year's report. Steps should be taken to reorganize the drainage pumping station on modern lines. The Board have acted on the recommendations made regarding the provision of a new rising main and extensions to the sewage farm and have submitted detailed

proposals for both schemes for the sanction of the Board of Public Health. The total cost is estimated at Rs.1,90,392 out of which Rs.84,697 will be spent on the rising main and Rs.1,05,695 on extensions to the sewage farm. A loan for the entire cost of the work has been approved by Government.

Magh Mela Water Supply Maintenance (Rs.14,564)—An adequate supply of piped water was given to the many lakhs of pilgrims visiting the annual mela. The works under the supervision of the Executive Engineer, 2nd Division, Public Health Department, were completed in time and satisfactorily maintained during the entire period of the Mela. A fire fighting service was organized by the Public Health Department Assistant Engineer and Overseer in charge of the mela water and electric supply arrangement. A trailer engine was loaned by the Allahabad Municipal Board and housed on the site but unfortunately the road watering lorry which in former years had been loaned by the Board was not made available. All conflagrations were promptly brought under control and extinguished. The organization of the mela fire brigade at Allahabad is dependent on the goodwill of the municipality, and this year the arrangements were upset by the road watering lorry not being made available and one had to be hired at the last moment. It is, therefore, strongly recommended that Government should purchase fire fighting appliances including both a trailer engine and chemical fire engine together with the equipment for use at the different melas.

Magh Mela Electrification (Rs. 11,116).—This work was carried out at short notice under the supervision of the Executive Engineer, 2nd Division, Public Health Department, by the Universal Engineering Co. and maintained in a most satisfactory manner during the period of the mela. The provision of flood lighting during the early morning hours at the bathing ghats was much appreciated by the devout pilgrims.

Magh Mela Miscellaneous Works—At the request of the Mela authorities, river training works at a cost of Rs.1,827 were carried out at short notice by the Executive Engineer, 2nd Division, Public Health Department, to ensure the safety of the pilgrims bathing at the Sangam. A pontoon bridge at a cost of Rs.731 was also erected at short notice to give direct communication to the Sangam.

Allahabad District Public Works—These remained under the control of the 2nd Division, Public Health Department, during the year under review. A progress report will be supplied for inclusion in Chief Engineer, Public Works Department (Buildings and Roads Branch) annual administration report as directed in G. O. no. 957/MS/217/MS/252, dated the 7th December, 1936.

Infectious Diseases Hospital (Rs.1,97,694)—Detailed proposals for this prepared by the Executive Engineer, 2nd Division, Public Health Department, at the request of the Municipal Board have received the administrative approval of the Board of Public Health.

Tube-well with Pumping Plant for Police Lines (Rs.4,700)—A forecast of cost for the provision of a 4-inch tube within an existing masonry well with electric motor pump has been prepared by the Executive Engineer, Well Boring Operations Division, and submitted to the Inspector General of Police, United Provinces, for approval and allotment of funds.

ALMORA.

Water Supply—This town is badly off for water during the summer months due to the diminished yield from the springs. Nothing so far has been done by the Board to augment the supply and the various suggestions put forward by this Department have not been given effect to mainly on account of paucity of funds. There have been complaints about the potability of the supply, the results of recent bacteriological analyses falling far short of the standards laid down. A simple and inexpensive scheme for chlor-ammioniating the supply from the different sources prepared at the request of the Director of Public Health has been supplied to the Board but so far no action has been taken in the matter.

It is not possible to effect any substantial improvements unless funds are provided. The financial position of the undertaking remains most unsatisfactory. An annual deficit of about Rs.9,000 has been recorded since 1934-35. No new assessment of property within the municipal limits has been made since the year 1912 and no water tax has yet been imposed. The management of the water-works now appears to be vested to the Executive Officer which is a most unsatisfactory arrangement and does not conduce to efficiency.

The Fyzabad Board have asked for the revision of the water supply and drainage schemes for Ajodhya prepared in the year 1927-28 but no staff is available for the purpose.

AJODHYA
(DISTRICT
FYZABAD)

The detailed estimate (Rs.37,920) for a water supply scheme including pumping plant and distribution system for the Dargah Syed Salar Fair prepared in 1936-37 has received the administrative sanction of the Board of Public Health. **BAHRAICH.**

A forecast of cost (Rs.14,100) for the provision of open drains on both sides of the main road together with a main outfall has been furnished to the Notified Area Committee. **BARHAJ. (DISTRICT GORAKHPUR.)**

Water Supply Maintenance—This Board were congratulated in last year's report on the success they had achieved in their waste prevention measures. But unfortunately the present board did not approve of the policy and during the absence of the Waterworks Superintendent on leave issued orders for the removal of all meters on domestic supplies including those which had been fixed in accordance with the bye-laws under powers vested in the Executive Officer on private connections where water was being wasted. This retrograde step will result in the hours of supply being reduced instead of being extended as was the intention. **BENARES.**

The board during the year submitted a project (Rs.2,18,152) for extensions to the open sand filters and the work is in hand and is being supervised by the Waterworks Superintendent. During the monsoon months open sand filters are little better than roughing filters and the installation of rapid filters had been advised by the Department mainly in view of the limited space available and the more uniform rate of filtration which would have remained constant throughout all seasons of the year.

The mechanical plant both at the filtered and unfiltered water pumping stations has been maintained in first class order and the Waterworks Superintendent has introduced many improvements and runs the plant at maximum efficiency. The reports of the Waterworks and Mechanical Engineer regarding the condition of the pumping plant are invariably satisfactory.

Drainage—Considerable progress was made in the previous year in desilting and rehabilitating the main sewers with the result that the escape of sewage from different outlets along the river front was much reduced. It is understood that the work has now slowed down due to funds to the full extent required not being available. It is hoped that the importance of this work will not be lost sight of as it is a health measure of major importance. The pollution of the river front at Benares is really an all-India matter and effective steps should be taken to stop this nuisance. Rehabilitation of the existing sewers will not altogether solve the problem as there are certain areas which cannot be drained into the existing sewerage system and the construction of a few automatic small sewage pumping stations will have to be taken in hand if the defilement of the river front is to be completely stopped.

Trial bores at Tulsighat (Rs.1,825). This work is being carried out by the Well Boring Operations Division on behalf of the Kashi Tirath Sudhar Trust. The trial bores are required to ascertain the nature of the ground adjacent to the river to enable stable foundations to be designed for the Tulsighat which was badly damaged during the last floods. Trial bore no. 1 has been taken down to a depth of 99 feet and bore no. 2 is in progress. It is expected that the work will be completed in May 1938.

Kumbh Mela Water Supply (Rs.17,659)—This work was taken up at short notice at the request of the Chairman, Municipal Board. The Board of Public Health gave a grant of Rs.7,822, the Director of Public Health an amount of Rs.4,000 from the savings in his budget and the Municipal Board provided Rs.3,000. The work included the carriage, erection and maintenance of steam pumping plant, the installation of a distribution system, the supply and erection of pressed steel tank and tank standposts and the construction of 20 single tap standposts. The supply was drawn from the existing tube wells which were constructed some years ago as a nucleus of a water supply along the banks of the river Jumna, and the whole work was completed in the space of a few weeks and an ample supply of water made available for the pilgrims during the entire period of the mela. At the request of the Chairman of the Board who supplied the necessary funds the pumping was continued for a further period of one and a half months after the mela was over. **BRINDABAN.**

The municipality have now asked for proposals for installing a permanent pumping plant and extensions to the distribution system and a forecast of cost is under preparation by the Well Boring Operations Division.

Drainage—No developments have taken place during the year. But some improvements will have to be made in the event of a water supply materializing.

BUDAUN.

Water Supply (Rs 2,000)—A forecast of cost for converting two open wells into tube wells has been furnished to the Board by the Executive Engineer, Well Boring Operations Division. The estimate provides for sinking 4-inch tube, 200 feet below ground level in two separate wells and the insertion of concrete plugs in the well steining.

CAWNPORE.

Water Supply Maintenance—The waterworks undertaking has continued to function satisfactorily during the year under review. There have, however, been complaints about the potability of the supply and the board have been advised to instal a chlorinating apparatus and to this they have agreed. The supply is now totally insufficient for the needs of this rapidly developing town and the board are alive to the situation and have called in the firm of Messrs. Bransby Williams & Temple, Chartered Civil Engineers of Calcutta and London to advise them. A preliminary report outlining the proposals of the consulting engineers has been received. A supply at the rate of 15,000,000 gallons per day is envisaged with provision for an ultimate supply of 25,000,000 gallons.

Drainage Extensions.—Permatghat Sewage Pumping Station Reorganisation (Rs.1,55,135).—This work is being carried out on behalf of the board by the Executive Engineer, Well Boring Operations Division. The contract for the pumping plant was placed with Messrs. Turner Hoare & Co., of Bombay, and for the building work with Messrs. P. P. De & Co. of Calcutta. The plant consists of transformers, high tension and low tension switch gears, a motor driven slung type of storm water pump of a capacity of 3,000 gallons per minute and two motor driven vertical spindle sewage pumps each of a capacity of 1,500 gallons per minute. The work is rapidly approaching completion.

The main drainage system of Cawnpore is now insufficient for the needs of the town and with the augmented water supply the main sewers will be badly overloaded. The Board have asked their consulting engineer to advise and submit a preliminary report in the first instance.

The Improvement Trust are faced with the problem of providing drains and sewers in the areas under development. The board are also vitally concerned in the matter as the areas will ultimately come within their jurisdiction. It is necessary that there should be full co-operation between the two authorities and that the drainage of the Cawnpore area should be considered as a whole and not as a separate responsibility to be shouldered independently by the authorities concerned.

DEHRA DUN.

Water Supply—The Bandal Nadi Scheme Rs.5,54,982 commenced in 1935-36 was completed in January, 1938. A supply of one cusec of filtered water of reasonable hardness is now available from this source. The new filter house was formally opened by Mrs. V. L. Pandit, the Hon'ble Minister for Local Self-Government. The Board have very wisely agreed to meter all private connections and up to the end of March, 1938 had installed 505 meters. The success of the scheme is now a foregone conclusion.

The Bandal Nadi scheme did not provide for the reorganization of the distribution system and a detailed project for this amounting to Rs.2,72,274 was furnished to the Board by the Executive Engineer, 1st Division, Public Health Department. Tenders were invited and that of Thakur Kundan Singh's accepted. The work is now well in hand.

The Board is now contemplating further extensions to the distribution system and the Board of Public Health have given a grant in-aid of Rs.12,275 towards the cost. With the completion of the re-organization of the distribution system an equitable supply should be available throughout the inhabited area. It is, however, doubtful due to the rapid developments which are taking place if the augmented supply will suffice for any length of time.

The Nala Pani and Kolukhet supplies have been improved as far as possible and the Board are certainly making the best use of the somewhat limited supplies available.

This board have a well deserved reputation for managing their affairs to the best advantage of the public and the advice tendered by this Department always receives due consideration and is usually acted upon.

Drainage—A portion of the Lakhu Jagh Drainage scheme has been satisfactorily completed. But the western portion of the town is in a very unsanitary condition and badly needs draining. The Board's attention has been drawn to this on several occasions, but so far no action has been taken. Finance would appear to be the stumbling block.

Sewage Farm—Further extensions to the sewage farm were completed in the year 1936. For the year 1936-37 the Board managed to lease out the farm for a sum of Rs 3,150 which is a very good return on a capital expenditure amounting to Rs 24,898.

Water Supply—Extension of Pipe Line to Dugah—An estimate amounting to Rs 7,893 was prepared for this by the Executive Engineer, Well Boring Operations Division in 1937-38 and after approval by the Superintending Engineer, Public Health Department, was forwarded to the Secretary, Dewa Fair and Exhibition Association, for administrative sanction and the provision of funds. DEWA.

The detailed project amounting to Rs.1,74,712 for a comprehensive water supply scheme prepared by the Executive Engineer, Well Boring Operations Division in 1936-37 received the administrative approval of the Board of Public Health during the year and a grant-in-aid of Rs.64,712 has been recommended towards the cost of the work. ETAWAH.

Drainage (Rs.14,300)—A forecast of cost for the construction of outfall drains was prepared by the Executive Engineer, II Division, Public Health Department, at the request of the Chairman and has been submitted to the board for consideration. FATEHPUR.

Water Supply Maintenance—The water supply to this small town was maintained during the year without any serious interruption. The supply, however, is entirely dependent on one pumping unit and it has been recommended on several occasions that the plant and well should be duplicated. The Notified Area, however, is badly off for funds and without some financial assistance from Government it is doubtful if they will be able to finance the extensions. FATEHPUR SIKRI.

There are only a few private connections and some of these have not yet been metered. An effort should be made to increase the number of private connections, all of which should be metered, so as to increase the revenue and to make the undertaking more self-supporting.

The mechanical plant, distribution system and tanks have been satisfactorily maintained during the year. The staff, however, is very limited and there is no one sufficiently qualified to relieve the Waterworks Superintendent should he take leave. An assistant driver competent to take charge in the absence of the Superintendent should be appointed.

Water Supply (Rs 3.00 lakhs)—A forecast of cost for a water supply scheme has been supplied to the Board, but so far they have not come to any decision on the matter. FIROZABAD (DISTRICT AGRA).

Water Supply Maintenance—The board have not yet tackled in real earnest the question of waste prevention. The town has experienced a water scarcity due to the diminished yield from the wells. The supply for some time was dependent on three out of the five tube wells, the aggregate yield being only 450 gallons per minute. No. IV well yielded a contaminated supply and had to be put out of commission and the supply from well no. III which had been reconstructed was also reported as being unsatisfactory. There was no choice but to resort to chlorination and as a temporary expedient three sets of Vitri Chlorinators were purchased. A more permanent and accurate method of chlorination should, however, be installed. FYZABAD.

The mechanical plant has been maintained taking all factors into account, in a very satisfactory manner and for this credit should be given to the Waterworks Superintendent. He is, however, badly handicapped by lack of skilled staff and one or two experienced mistris on a better scale of pay should be appointed. In view of the age of the plant systematic and frequent overhauling is now necessary.

Pumping plant for the tube well replacing defunct well no. III (Rs.25,138)—The contract was given to Messrs. Jessop & Co. of Calcutta and the work comprises the installation of an oil engine driven air compressor with accessories to operate new air lift pump. The well was completed during the year but final tests have not yet been run.

Provision of tube well with pump to replace defunct well No 11 (Rs 15,311)—Detailed estimate for this under preparation for proposed to take down the boring 300 feet below ground level. The tube will be 9-inch diameter increased to 12 inches to admit of 10 inches suction pipe.

Installation of Chlorination Plant (Rs 6,700)—A forecast of cost for the installation of a suitable permanent plant has been furnished to the Board by the Executive Engineer, Well Boring Operations Division.

GHAZIPUR.

Water Supply (Rs 66,585)—The preliminary estimate of the comprehensive scheme estimated to cost Rs 1,41,200 has practically been completed and supply has already been made available to the town. Some difficulty has been experienced over staff appointments the Board not in agreement with the Department's recommendations.

GOLA GOKA- RANNATH

Water Supply Maintenance—The plant is old and obsolete and no improvements have been possible due to the District Board's inability to provide funds. The matter has been under correspondence for several years but nothing has been decided and there is a grave danger of complete breakdown and a cessation of the water supply unless some action is taken.

The waterworks cater for the requirements of thousands of pilgrims attending the annual and periodic melas but no funds have been credited by the District Board to the undertaking for this service and no effort has been made to make the supply even partially self-supporting by increasing the number of connections or taking steps to extend the supply to other parts of the town.

The position is most unsatisfactory and unless some immediate action is taken there is a likelihood of thousands of pilgrims being deprived of a potable water supply with the consequent risk of a cholera epidemic.

GORAKHPUR.

This town has no piped water supply. The inhabitants draw their supplies from Abyssinian tube wells or from open wells.

Improvement of District Jail Water Supply—A forecast of cost (Rs 1,350) for sinking a tube in the existing well at the District Jail was furnished to the Superintendent by the Executive Engineer, Well Boring Operations Division, Public Health Department, but the proposal has been dropped for want of funds.

Drainage—II Instalment (Rs 20,335)—Construction was started in April 1937 and most of the items had been completed by September 1937 when the works were suspended for want of funds. Government loan was made available in October 1937 and the work started afresh and completed.

Drainage—II Instalment—Supplementary Estimate (Rs 10,786)—The Board of Public Health gave a grant for the full amount of the estimate which provided for the construction of revetment walls along the sides of the storm water drain for the protection of the Provincial and District Board roads. The work has been completed and will shortly be handed over to the board.

HARDOI.

Drainage Extensions—II Instalment (Rs 55,000)—A fair project providing for the construction of surface and storm water drains in blocks A, B and C is under preparation by the Executive Engineer, 2nd Division, Public Health Department.

HALDWANI.

Water Supply Maintenance—There is no improvement to record in the management of this undertaking. Proposals for improving the supply have been turned down by the Notified Area Committee on the plea of lack of funds. The quality of the water supplied to the public has repeatedly been adversely reported on by the Director of Public Health but no effective action has been taken to improve matters. The supply is not properly controlled, no waste prevention measures have been introduced and no water tax has been levied so the concern is not self-supporting. Night tests are not properly run, the actual quantity of water supplied is not known as bulk meters have not been installed on the leading mains and the returns supplied are usually incorrect. The hours of supply had to be reduced during the months of May, June and part of July, 1937, water being turned off from 8.0 p.m. to 4.0 a.m.

Water Supply Improvements (Rs. 37,025)—A revised forecast of cost for providing rapid filters, chlorinating plant, 6-inch meters and ancillary work was prepared by the Executive Engineer, 2nd Division, Public Health Department, and presented to the Notified Area Committee, but was not accepted, the explanation being that a supplementary supply to be taken from the canal was under consideration.

Water Supply Maintenance—The supply here is drawn from tube wells. The three wells at Tibai gave a satisfactory yield throughout the year and there was no scarcity during the hot weather. The fourth well at Chandi functioned satisfactorily. HARDWAR.

The tube well pumping plants at Tibai were thoroughly overhauled during the year as a safety measure and to enable an enhanced supply expected on account of the Kumbh Mela to be given during the year 1938.

Waste prevention measures have not been properly tackled. No new meters have been purchased during the past three years and most of the meters in stock are unserviceable.

The staff question is still unsatisfactory. More efficient men are required and the recommendation for the appointment of a qualified assistant has not yet been given effect to.

The chlorinating plant at Tibai functioned satisfactorily and ensured a potable supply to be given throughout the year.

Drainage—The revised project amounting to Rs.5,57,579 for a comprehensive scheme of drainage was sanctioned in 1935. A project for a sewage farm was subsequently prepared and received technical approval in 1936. As the town projects were complementary, it was considered advisable to combine them into one and this was done and considerably facilitated the preparation of the contract documents.

The total estimate for both works amounted to Rs.6,19,453 and tenders were invited in July, 1936, and the work given to Rai Bahadur Seth Chandi Ram Verhomal Doulatani whose offer was the lowest.

At the start the Board were only in a position to provide funds to the extent of Rs. 5 lakhs only and there was no alternative but to limit the expenditure to this amount. It was, therefore, decided to leave out the construction of the public water flushed latrines, the cost of which was estimated, at about one lakh of rupees. However, owing to keen competition very low rates were received and out of the savings it has been possible to complete a portion of this work as well as the installation of some of the urinals and pail depots. Thus most of the work included in the original project will be completed within the funds available. A further grant of Rs. 20,000 towards the cost of the work was made by the Board of Public Health during the year.

The expenditure during the year under review on this original work amounted to Rs.2,20,540.

Drainage of Bhimgoda Area—It has been found that it is not possible to drain this area into the main drainage system unless pumping is resorted to and until this area is sewered the pollution of the Ganges will continue. The Medical Officer of Health was very anxious that this work should be taken up along with the main drainage, so a forecast of cost amounting to Rs.50,000 was submitted to the board for dealing with this area and pumping the sewage into the existing system. Unfortunately funds were not forthcoming and the scheme had to be shelved.

Har-ki-pairi Improvements—The original comprehensive scheme for this amounting to Rs.1,95,528 was sanctioned in 1932 and the construction of a reinforced concrete bridge connecting the island platform with the Jammu steps was subsequently completed at a cost of Rs.20,561 and handed over to the Board.

Tenders for the remaining works were invited in November, 1931, but construction could not be started until January, 1937, due to difficulties in acquiring property scheduled for demolition. Time was, therefore, extremely limited as it was imperative that everything should be completed before the Kumbh Mela, due to begin in April, 1938. Most of the work was extremely difficult and involved rock cutting and foundation work under water level. Much credit is due to Messrs. Trivedi and Ulfat Rai, Executive and Assistant Engineers, respectively in charge and the contractor Rai Bahadur Seth Chandi Ram Verhomal Doulatani. The expenditure incurred under this head during the year amounted to Rs.85,968. Improvements to the Bhimgoda Road were also carried out at the same time.

Fire Fighting Appliances—This town is badly off for fire fighting apparatus. There should be a properly equipped fire engine and a trained personnel to handle it, otherwise much damage to property and persons might result especially as certain areas are badly congested.

HATHRAS.

Water Supply Maintenance—The supply here is dependent on tube wells. The number of metered connections now amounts to 421. A water tax at the rate of $2\frac{1}{2}$ per cent. has been imposed but realizations have been poor and nearly 90 per cent. of the demand was outstanding at the close of the year.

Trouble was experienced during the year with the tube wells; two remained out of action for some time, one on account of the air pipe rusting and the other due to the unpotability of the yield. It was not possible to instal the chlorinator during the year. When this is available, troubles in regard to the potability of the supply should cease. A continuous 24 hours supply was given to all private consumers.

The mechanical plant as well as the distribution system continued to function satisfactorily. Some trouble was experienced with one of the pumps but this was put right by changing some of the parts.

The staff in spite of their pay being reduced worked well. They should be given the benefit of the original grades of pay they were appointed against, otherwise the efficient members may leave and discontent will persist amongst those remaining.

During the year a distant water level indicator and a bulk meter for measuring the supply were installed. Some other useful additional works were also carried out with the savings that accrued on the estimate.

Chlorination *Chlorination Plant* (Rs.5,745)—Due to the unsatisfactory analyses of the water, *chlorination* has been recommended by the medical authorities and an estimate for a suitable plant has been supplied to the board, and the Board of Public Health have agreed to give a grant-in-aid of half the cost and the balance will be met from the savings in the estimate. Tenders have been called for and they are now under consideration.

Drainage (Rs.3,10,692)—A forecast of cost for improvements and extensions to the drainage system was furnished to the Board by the Executive Engineer, 1st Division, Public Health Department, but the Board demanded a guarantee of a grant of Rs.2 lakhs from Government before proceeding further and as there is little likelihood of this being forthcoming, there is little hope of the scheme materializing.

Fire Fighting Equipment—This is very deficient. Suitable equipment should be purchased and a fire brigade organized.

JAUNPUR.

Water Supply Maintenance.—The new waterworks have only been in commission a year but already 238 metered connections have been given. The quality of the water supplied has been satisfactory in spite of the fact that the mechanical filters have had to operate under adverse conditions due to considerable fluctuations in the draw-off. Some improvements in the chemical dosing apparatus are contemplated and it is also proposed to use the wash water tank as a balancing tank to ensure a uniform rate of filtration. The pumping plant has functioned satisfactorily during the year.

The staff arrangements could be much improved. Inspecting officers have complained of the inefficiency of certain members on several occasions.

A water-tax has been introduced in spite of the protests of the public and the undertaking should be self-supporting if the board do not relax the rules.

Certain extensions to the distribution system have been made and more are contemplated. These, however, should not be carried out haphazardly but follow *accompanying* the alignments shown on the plans *accompanying* the detailed proposals.

A considerable amount of filtered water is being used for road watering and a proposal for pumping this direct from the river is under consideration.

Fire Fighting Equipment—This is deficient and a fire brigade should be organized.

Drainage—Now that a piped water supply is available, the many defects in the drainage system have been brought to light. The board are, however, alive to the situation and are contemplating applying for the preparation of a detailed scheme.

JHANSI.

Water Supply Maintenance—The pumping plant is old and very uneconomical and its replacement has been recommended on repeated occasions by the Mechanical Engineer. However, in spite of its defects the staff managed to maintain the supply without interruption during the year.

A scheme for the reorganization of the entire water supply of the town has been proposed and the Board have asked for a forecast of cost to be prepared outlining alternative proposals. The water supplied to the public during the rain invariably falls far short of the purification standards laid down and filtration and sterilization will have to be resorted to.

The construction of a masonry service reservoir in the city, which was completed and handed over in May, 1936, and the installation of a chlorinator, has improved matters to some extent but much remains to be done and an early decision should be arrived at on the reorganization proposals.

The supply of coal and also of chemicals such as alum and chlorine has been very unsatisfactory during the year, so much so that nearly 25 per cent. of the coal supplied consisted of ash. The supply of alum and chlorine was at one time during the year completely exhausted.

A new agreement on more favourable terms for the continuance of the water supply from the Pahuj reservoir has been entered into with the Irrigation ^{Irrigation} Department. No other source of supply being feasible.

The staff maintained has been sufficient but a qualified pipe line inspector is badly needed so that the Waterworks Superintendent can devote more time to the mechanical plant.

Water Supply Maintenance—The water supply was maintained satisfactorily during the year. Considerable difficulty, however, was experienced when the oil engine was shut down for overhaul. There is no standby plant and it is to the credit of the staff that the supply was only curtailed for a few days while the overhaul was in process. Proposals for duplicating the plant have been supplied to the Notified Area Committee but lack of funds is deterring action. The position is serious and a strenuous effort should be made to instal a new engine otherwise a complete ^{complete} "shut down" of the supply for a lengthy period will have to be faced sooner or later. KOSI.

The staff employed is mostly illiterate and the undertaking is dependent on one man, viz., the Waterworks Superintendent, and he should be given the services of a person capable of taking charge during his absence.

The supply was maintained continuously throughout the 24 hours and the percentage of unaccounted for water has remained remarkably low for which credit must be given to the Waterworks Superintendent. The yield of the tube well has shown signs of diminishing and this is being investigated.

Water Supply Extension (Rs.37,269)—An estimate prepared by the Executive Engineer, Well Boring Operations Division, for a new tube well with pumping plant and an additional storage tank to act as standby in case of breakdown has been furnished to the Notified Area Committee for acceptance and provision of funds.

Water Supply Maintenance—The pumping plants at both the filtered and unfiltered stations have functioned satisfactorily during the year. Scarcity of water in several localities especially in the hot weather prevails to the same extent as formerly. Some temporary relief has been afforded to the inhabitants in certain areas by the construction of a trunk main but the provision of new mains or even the reorganization of the distribution system will not afford permanent relief unless waste is more rigorously controlled than hitherto. The installation of meters as permitted by the byelaws would have a more salutary effect in checking waste than the issue of warning notices which in most cases is ineffective. LUCKNOW.

The Board have embarked upon a big programme of capital expenditure but so far do not appear to have decided on the supply *per capita* or the ultimate population to be served. This fact has been brought to their notice.

The financial position of the waterworks undertaking is steadily deteriorating and recurring charges are being increased by heavy annual payments on account of interest and sinking fund charges on the loan taken for capital works. Income unfortunately is not increasing proportionately and a heavy deficit will have to be faced unless waste prevention is more rigorously pursued and the transgressors severely dealt with. Establishment costs are also increasing. The staff, taken as a whole, and particularly the section employed on waste prevention measures is the largest in the province and the results obtained particularly in regard to determining and checking waste are the least convincing.

The completion of a new clear water reservoir has improved matters to some extent by providing more filtered water storage but the installation of a fourth pump at Aishbagh of sufficient capacity to deal with a day's supply is badly

required and the Board have been asked to submit proposals for this unit. There is also not sufficient standby plant at Chaughat and this also has been brought to the notice of the Board.

Installation of Motors (Rs.50,000)—A loan for this was made available in November, 1937, but the board have only just succeeded in placing an order for the supply.

The Chairman and members of the Board are very concerned about the financial position of the town and in regard to the waterworks undertaking have requested that an officer of this Department should investigate and report on measures to be taken to effect improvements. Mr. Gupta, Assistant to the Mechanical Engineer, has been deputed for the purpose and his report should be available shortly.

Drainage—The pumping plant at the sewage pumping station is in a precarious condition and replacement of the units by chokeless pumps should not be postponed. The drainage conditions of the town have gone from bad to worse and it is imperative that some action should be taken on the recommendations of the Lucknow Drainage Inquiry Committee. There is a grave danger of the bund giving way in the event of the open excavation on the Western Intercepting Sewer adjacent to the sewage pumping station caving it.

Fire Fighting Equipment—There are two steam and two petrol driven Merryweather fire engines. There is also a small manual engine available. Both the petrol driven engines are mounted on automobile chassis and are well maintained. The staff are alert and well up in their duties. Additional hose pipes should be purchased as the serviceable length is only approximately 3,000 feet. The accommodation is insufficient to house all the engines at one time. One of the steam engines is kept permanently at the Chowk Kotwali and although shelter is provided for the engine none is available for the crew. A central station is badly needed along with staff quarters.

Maintenance of Ghaziuddin Hyder Canal Sewer and Lining (Rs.7,750)—This was maintained departmentally by the Executive Engineer, 2nd Division, Public Health Department, and the works kept in good repair. The sewer is just about working to capacity and much difficulty is being experienced in keeping the lining clear due to the sewage from the adjacent developed areas accumulating in the channel.

Special Repairs to Gomti Weir (Rs.21,000)—These were necessary due to the erosion both upstream and downstream after the floods of 1936. It was necessary to deposit considerable quantities of block *kankar* in the bed of the river and to protect the banks.

Maintenance of Gomti Weir (Rs.3,500)—This work was also carried out departmentally by the Executive Engineer, II Division, Public Health Department.

Installation of Sanitary Fittings for Clerks and Menials in the Public Works Department (Buildings and Roads Branch) Secretariat Office (Rs.5,626)—The estimate for this work was revised at the request of the Chief Engineer, Public Works Department (Buildings and Roads Branch).

MEERUT.

Water Supply Maintenance—The conditions remained the same as mentioned in the previous year's report. The water turbines are extremely old and costly to maintain. The standby plant is uneconomical and insufficient with the result that the supply hours have to be curtailed during the time of canal closure. At other times a 24 hours continuous supply is maintained.

In spite of frequent recommendations the 75 connections taken from the rising main still remain unmetered and no steps have been taken to provide a separate rider main as an alternative to the installation of meters.

No water tax is imposed, so, much needed improvements and extensions cannot be financed. The Waterworks Superintendent has done his best to improve matters and the uninterrupted water supply, in spite of the age of the plant, is largely due to his efforts. He should be given the services of a competent pipe line inspector as the present arrangement, whereby he spends half his time at Meerut supervising the distribution system and the remainder at Bhola, some 15 miles distance supervising the mechanical plant, is considered most unsatisfactory.

A forecast of cost providing for many improvements to the undertaking such as the provision of a separate elevated tank for the high zone area for improving the supply to the Civil Lines and new mains in the recently developed Begam Bagh area was furnished to the Board by the Executive Engineer, 1st Division, but no action has been taken.

Fire-fighting equipment—The condition of the fire-fighting equipment as previously reported and is woefully deficient. MIRZAPUR.

Water Supply Maintenance—There is no improvement to record in the state of this undertaking. The condition of the masonry of the overflow weir at Tanda reservoir is deteriorating. Repairs to the embankment and pitching as recommended by the inspecting officers have also not been attended to. The quality of the water supplied to the public has been adversely reported on for some years by the Director of Public Health, and the Board have asked this Department to advise and report.

Waste prevention measures have not been enforced. No night tests have been run during the year and the few remaining meters have not been maintained satisfactorily and are being reduced from day to day. The number of standposts has increased by leaps and bounds. Originally these were only 72 and now they are 290.

In spite of the fact that no water tax is imposed, the waterworks is a source of profit but to finance a big scheme of reorganization it will be necessary to levy some tax.

Water Supply Improvements (Rs.1,50,000)—A forecast of cost for the installation of filters, chlorinating plant and extensions and improvements to the distribution system has been supplied to the Board by the Executive Engineer, 2nd Division, Public Health Department, Allahabad.

Water Supply (Rs.36,528)—A detailed project for new waterworks comprising pumping plant, elevated reservoir, distribution mains and standposts has been prepared by the Executive Engineer, 2nd Division, Public Health Department, and submitted to the Notified Area Committee for acceptance. MOGHAL SARAI.

Trial Tube Well (Rs.7,728)—This was completed during the year by the Reliable Water Supply Service of India of Lahore under the supervision of the Executive Engineer, Well Boring Operations Division, Public Health Department, Cawnpore. The bore was taken down to a depth of 237 feet and on test afforded a yield of 183 gallons per minute against a depression head of 22½ feet. The estimated requirements of the Notified Area are 100 gallons per minute, so the well should easily meet the normal demand.

Water Supply Maintenance—This undertaking is managed for the Moradabad Water Supply Co. by Messrs. Noorulla Ghazanfarulla of Allahabad. MORADABAD.

The waterworks have only recently been constructed and so far only a few private connections have been given. It is understood that the licensees are negotiating with the Municipality in regard to a modified standpost supply.

Some of the results of the bacteriological analyses of the water supplied have not been satisfactory and it is advisable when the supply develops that some sterilizing plant should be installed and the licensees have been informed accordingly.

Water Supply Maintenance—All the four pumping stations functioned satisfactorily during the year. The mechanical plant received adequate attention and routine overhauls and the replacement of worn out parts has been carried out whenever necessary. Work in connection with the reorganization of the distributing system has proceeded systematically and all existing sources of supply have now been tapped and an ample supply made available to the public. MUSSOORIE.

For the purpose of ascertaining the amount of water used for public purposes, a few standposts were metered and also other municipal supplies such as road watering hydrants and connections for drain flushing. The waterworks account is now being credited with water supplied for municipal purposes.

Due to the zoning of the distribution system and the proper application of night tests, waste has been reduced to a minimum with consequent savings and the Board have been able to reduce the water tax by 25 per cent.

Night tests and inspections revealed a number of invisible leakages which would have been impossible to detect during the day and when these were stopped a further reduction in pumping hours was found possible.

The semi-positive type of water meters as recommended by this Department have been obtained and installed. This type of meter besides having a longer life was found to register the discharge much more accurately than the inferential type.

Hydro-electric Undertaking—During the year several slips occurred and damaged the power pipe line and frequent repairs had to be undertaken to enable the electric supply to be uninterrupted without interruption. The headworks are in the process of being reorganized and good progress is being made. The plant both at Golegi and Katlagarh stations was well maintained during the year and no major repairs were necessary. The central workshop at Dehra Dun continued to give satisfactory service and several jobs were carried out which would have involved heavy expense if done elsewhere.

Reorganization of the Electric Supply Undertaking (Rs.11,000)—This project which was sanctioned in the previous year is being carried out under the supervision of the Board's technical officers and good progress has been made up to date.

MUTTRA.

Water Supply Maintenance—The main pumping plant and the standby plant continued to give satisfactory service. The standby plant comprising oil engines, generators and D. C. motor is somewhat antiquated and should be disposed of when the existing motor is replaced by an A. C. motor which has been provided for in the reorganization proposals now under preparation.

All five tube wells have given a sufficiency of water aggregating about 1,600 gallons per minute. The undertaking on the whole has been well managed and the Chairman and the Board realize their responsibilities and the recommendations made by this Department are usually given effect to.

The renewal of the agreement for the electric supply on terms acceptable to both parties was only agreed to after protracted discussions. At one time the Board contemplated the erection of their own generating station and an outline scheme for this at the request of the Chairman was drawn up by this Department.

The pumping unit installed on the fifth tube well remained in satisfactory condition.

Meter testing equipment has been purchased and this has been accommodated in a room built specially for the purpose. Waste prevention measures were continued throughout the year but the results did not come up to expectations. Private house connections and public standposts increased during the year by 199 and 12 respectively.

Water Supply Improvements (Rs.3,50,000)—A forecast of cost for a comprehensive scheme of extensions was furnished to the Board during the year by the Executive Engineer, 1st Division, Public Health Department. The scheme with some modifications was approved by the Board and a detailed project is now under preparation. Much needed improvement will be effected when the scheme is carried out. The High Zone will have an independent supply with adequate terminal head.

Additional Tube Well (Rs.9,222)—A forecast of cost for this has been presented to the Board by the Executive Engineer, Well Boring Operations Division. It is proposed to sink a tube well 9 inches diameter 200 feet below ground level to supplement the existing supply. Detailed proposals are now under preparation.

Drainage—Maintenance—The drainage system on the whole has been satisfactorily maintained throughout the year. The sewage pumps, however, could be worked to better advantage. The sewage is allowed to back up in the outfall sewer and this causes much deposit of sludge. If this practice is not stopped there will be repercussions, in that the drainage system will gradually become choked up and considerable expenditure will have to be incurred on desilting operations. The sewage farm made a substantial profit.

Drainage of Antapara (Rs.19,294)—A project for this was sanctioned in 1937. The Board of Public Health have given a grant for half the cost and the balance will be met by loan. Tenders have been invited for the construction.

MUZAFFAR
NAGAR.

Drainage (Rs.70,200)—A fair project for a much needed drainage extension has been sanctioned by the Board of Public Health. But the Municipality has so far not made any arrangements for financing the work.

NAINI TAL.

Five n.

Water Supply Maintenance—The plant at the main station has operated satisfactorily. Some little trouble was experienced with no. 6 pump but this was overcome and an adequate supply of water was given to the public throughout the year.

A new E. C. I. D. sterilizing plant was installed and brought into operation during the year. It is hoped that this will neutralize the taste of chlorine of which there have been many complaints in the past.

The Board's Mechanical and Electrical Engineer has endeavoured to carry out the recommendations of this Department particularly in regard to the introduction of waste prevention measures but many improvements recommended have not been taken up on account of financial stringency.

There is difficulty in obtaining skilled labour in the locality and the remuneration offered is not enough to attract good men from the plains. A lot of the mechanical work has therefore to be attended to personally by the Board's Mechanical Engineer which is not economical as his time could be better utilized in other ways. The services of a first class mistri competent to carry out running repairs should be obtained.

Hydro-electric Supply Maintenance—A strike which might have resulted in a complete shut down of the supply occurred in the summer of 1937. The Officiating Mechanical and Electrical Engineer, however, acted promptly and suspended a few of the ringleaders who were afterwards dismissed. The supply was not interrupted.

The mechanical plant has been well maintained but there is really no adequate standby. A subsidence in the masonry pillars carrying the power pipe line would suffice to throw the power station out of action and the town would be without lights and water until repairs could be effected. An auxiliary station is badly required or an alternative supply from the "grid" should it ever be extended to serve Kumaun.

Drainage—Some interest is now being shown in this subject and it is understood that the preliminary scheme prepared by the Executive Engineer, 2nd Division, is now being resuscitated.

Drainage—The town has been surveyed by the 1st Division, Public Health Department, and a set of the survey plans has been furnished to the Board, but so far no decision has been come to regarding the preparation of a scheme.

NAJIBABAD.

Water Supply (Rs.92,610)—Detailed proposals for a comprehensive water supply scheme have been prepared by the Executive Engineer, Well Boring Operations Division, and presented to the Board. The estimate provides for a supply of water to the inhabited area excepting the Civil Lines to be drawn from the tube-well already constructed. A supply at the rate of 10 gallons per head per day is proposed. This will be distributed from an elevated tank of 12,000 gallons capacity and made available to the public through reinforced tank standposts each of 400 gallons capacity. The cost of the supply works out at about 4.5 annas per thousand gallons. As the bacteriological analysis of the supply, ~~derived~~ ^{crived} from the tube well shows signs of pollution, a chlorination plant has also been provided.

ORAI.

Drainage (Rs. 1,90,000)—A forecast of cost for a comprehensive scheme has been supplied to the Board. At the present time the drainage conditions are both primitive and deficient and matters will become worse when the water supply scheme materializes. The preliminary scheme provides for surface drains, and where necessary, underground sewers. At the outfall it is proposed to pump the sewage and dispose of it on a farm.

Drainage—A survey of the town has been completed and a set of plans supplied to the Notified Area Committee. A forecast of cost outlining rough proposals has also been furnished but no decision has been arrived at in regard to the preparation of a fair scheme.

RIKHIKESH.

Improvements to well (Rs.2,994)—A small tube well 2½ inches diameter carried down a depth of 212 feet has been inserted in the well at the Police Station to improve the yield. The work is nearing completion.

SAHSON,
(DISTRICT
ETAWAH).

Water Supply Maintenance—A continuous 24 hours supply has been maintained throughout the year in spite of a diminished yield from the tube well. The bacteriological analyses of the water supplied show that there is pollution and a searching inquiry has been made to discover the cause. As a safety measure the installation of a sterilization plant is necessary and a forecast of cost (Rs.4,022) providing for suitable apparatus has been furnished to the Board.

UNAO.

The pumping plant continued to function well and the alteration in the size of the pulley driving the air compressor has been effective.

A bulk meter for measuring the total quantity of water supplied was installed during the year in accordance with the recommendations of the Water-works and Mechanical Engineer.

Some trouble has been experienced in obtaining skilled labour. The remuneration offered is not sufficient to attract competent personnel. So in consequence the work suffered for a considerable time for want of a proper fitter.

A forecast of cost for extensions of the distribution system to the Civil Lines has been accepted by the board and detailed proposals will be taken up if satisfactory arrangements can be made for financing the work.

This small undertaking is well managed. Waste has been reduced to a minimum and leaky taps and sandpots are not in evidence. Some of the class I municipalities would do well to follow the example of this small municipality in the management of their water supply undertakings.

Much credit is due to the board and their Waterworks Superintendent for the very satisfactory results obtained which is mainly due to adopting recommendations of this Department. This undertaking is managed in the best interests of the public.

Drainage Maintenance—Besides a piped water supply this little town has an underground drainage system which unfortunately only serves a limited area.

The sewage pumping station continued to function satisfactorily but the volume of sewage is so small that little of it reaches the sewage farm. This condition will remain until the second instalment of the drainage project is carried out.

Advice has been given to most Government departments on matters which come within the scope of this Department's activities. Advice on multitudinous matters has also been tendered to most of the municipalities. The Superintending Engineer has also advised the Board of Public Health on proposals and projects for health works of an aggregate value of Rs 47.50 lakhs during the year.

F. D. TUNNICLIFFE,

M.C., Assoc. M. Inst. C.E.,

LUCKNOW :

Superintending Engineer, Public Health Department,

9th September, 1938.

United Provinces.

MISCELLA-
NEOUS
WORKS.

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MISCELLA-
NEOUS
WORKS.

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OF THE

SUPERINTENDING ENGINEER

PUBLIC HEALTH ENGINEERING DEPARTMENT

UNITED PROVINCES

FOR THE YEAR ENDED MARCH 31, 1937



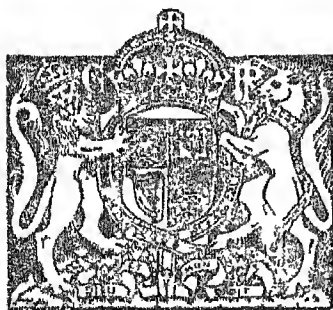
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1937

FORTY-SECOND ANNUAL REPORT
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SUPERINTENDING ENGINEER
PUBLIC HEALTH ENGINEERING DEPARTMENT
UNITED PROVINCES

FOR THE YEAR ENDED MARCH 31, 1937



ALLAHABAD:
SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES
1937

**Forty-second Annual Report of the Superintending Engineer,
Public Health Engineering Department, United Provinces,
for the year ended 31st March, 1937.**

THE following table shows the extent of the duties undertaken by this department during the year under review

Item no.	Nature of work	Amount involved in lakhs of rupees	Remarks																												
1	Duties under the Local Authorities Loans Act, 1914, and the Municipalities Act, 1916, i.e., the supervision and inspection of all open waterworks, drainage pumping stations and hydro-electric supplies.	77.76	This amount represents the turnover in revenue and expenditure on water-supplies, drainage pumping stations, sewage farms and hydro-electric supplies and is made up as follows: <table border="1"> <thead> <tr> <th></th><th>Revenue</th><th>Expenditure</th><th>Total</th></tr> <tr> <th></th><th>Rs.</th><th>Rs.</th><th>Rs.</th></tr> </thead> <tbody> <tr> <td>Water-works.</td><td>30,78,177</td><td>30,94,681</td><td>61,72,858</td></tr> <tr> <td>Drainage pumping stations</td><td>..</td><td>1,69,779</td><td>1,69,779</td></tr> <tr> <td>Sewage farms</td><td>58,139</td><td>17,676</td><td>75,815</td></tr> <tr> <td>Hydro-electric supplies.</td><td>7,01,983</td><td>6,53,456</td><td>*13,55,439</td></tr> <tr> <td>Total ..</td><td>38,38,299</td><td>39,27,592</td><td>77,65,891</td></tr> </tbody> </table>		Revenue	Expenditure	Total		Rs.	Rs.	Rs.	Water-works.	30,78,177	30,94,681	61,72,858	Drainage pumping stations	..	1,69,779	1,69,779	Sewage farms	58,139	17,676	75,815	Hydro-electric supplies.	7,01,983	6,53,456	*13,55,439	Total ..	38,38,299	39,27,592	77,65,891
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2	Local works—																														
	(a) Preparation of projects ..	21.84	19 detailed proposals.																												
	(b) Construction ..	7.14	Payments made.																												
3	Provincial works—																														
	(I) Miscellaneous—																														
	(a) Preparation of projects ..	1.18	18 detailed projects.																												
	(b) Construction ..	0.36	Payments made.																												
	(c) Maintenance ..	0.18	Lucknow Gumbi Weir, Ghaziuddin Hyder Canal Anti-Malarial Works, Allahabad Magh Mola and Executive Engineers, I and II Divisions, offices and residence maintenance.																												
	(II) Allahabad District Public Works Department works—																														
	(a) Preparation of projects ..	5.17	48 detailed projects.																												
	(b) Construction ..	1.44	Payments made.																												
	(c) Maintenance ..	1.78																													
4	(a) Advice free to local authorities ..	8.50	18 forecasts of cost with reports furnished.																												
	(b) Advice free to Government departments ..	0.69	6 forecasts of cost with reports supplied free.																												
5	Board of Public Health business—																														
	(a) Examination of projects for urban works.	39.52	30 projects and 6 forecasts of cost were scrutinized.																												
	(b) Examination of projects for rural sanitation.	2.40	501 projects were scrutinized.																												
	(c) Checking progress on urban and rural areas works, G. O. nos. 463/XI, dated the 6th February, 1931, 470/XI, dated the 6th February, 1931, 580/XI, dated the 11th February, 1931, and 490/XI, dated the 9th April, 1931.	3.50	Progress reports collected and consolidated for the Accountant General, United Provinces.																												
6	Examination of projects for Provincial works.	7.01	39 projects were examined.																												
7	Inspection and reports on works carried out by local bodies.	1.07	Mussoorie and Lakhnau (Dehra Dun) works.																												
8	Scrutiny of certain municipal budgets, G. O. no. 4718/XI—10-H, dated the 6th January, 1933.	92.43	This represents the total figures of original budget schedules of water supplies, drainage works, sewage disposal and hydro-electric supplies under head revenue and expenditure.																												

N.B.—The figures for the Allahabad District Public Works Department works have also been supplied to the Chief Engineer, Public Works Department, Buildings and Roads Branch, for inclusion in his annual report as required by Public Works Department, Buildings and Roads Branch, G. O. no. 907/MS/217/MS-252, dated the 7th December, 1935.

*This figure includes revenue and expenditure for Hardwar electric supply.

2. The expenditure on works carried out by the department during the year amounted to Rs.10.81 lakhs. The total value of works for which projects including preliminary proposals and forecasts of cost were framed amounted to Rs.37.38 lakhs in the year.

FEES AND REALIZATIONS.

3. A total amount of Rs.97,878 was earned in fees for works carried out for local authorities. These fees are levied in accordance with Government orders only on the duties undertaken under item 2 of the table above. The fees earned on the supervision of construction amounted to Rs.75,060 while the fees earned on the preparation of projects amounted to Rs.22,818 making up the total referred to above.

In addition to the above fees a sum of Rs.1,567 was recovered for hire of tools and plant from contractors. A further sum of Rs.1,359 was realized as supervision charges on the value of works carried out in the work-shops of the Well Boring Operations Division, Cawnpore.

BUDGETS OF LOCAL AUTHORITIES.

4. The budget schedules of the local authorities received in this office show that a total turnover of Rs.92.43 lakhs took place during the year, under the head revenue and expenditure incurred on water supply, hydro-electric supply and drainage works. Those municipalities who provided piped water supply incurred a total expenditure of Rs.34.56* lakhs on these supplies during the year.

WATER SUPPLY

NUMBER OF UNDERTAKINGS

5. There are now 24 public water supply undertakings in the province as against 12 in 1920. During the year under review new waterworks were inaugurated at Jaunpur. Twenty-two of the undertakings are under the management of local authorities and two, Aligarh and Moradabad, are in the hands of licensees as permitted by the amendment to the Municipal Act of 28th October, 1930. The number of municipal hydro-electric undertakings, viz. two, remains the same as last year. The capital invested in the water supplies controlled by local authorities now amounts to Rs.3.23 crores.

POPULATION SERVED AND COST OF SUPPLY.

6. A total population of 1,480,972 is served by the concerns administered by local authorities. The average daily supply is 42.425 million gallons and the maximum daily average in any one month is 49.987 million gallons. The total consumption per head per day varies from 45.38 gallons at Lucknow to 2.85 gallons at Gola Gokaran Nath. The cost per thousand gallons of water supplied is only 0.97 annas at Meerut, there being no interest and sinking fund charges to meet. The cost at Agra, Allahabad, Benares, Cawnpore and Lucknow is 2.73, 3.17, 2.71, 2.95 and 2.86 respectively. The total charges per thousand gallons at Mussoorie which are the highest in the Province amount to 21.51 annas.

PROFIT AND LOSS.

7. The following Boards have run their water works at a profit:

Agra, Allahabad, Cawnpore, Lucknow, Meerut, Naini Tal, Mirzapur, Muttra, Fyzabad, Hardwar and Kosi, and a loss has been incurred at Benares, Mussoorie, Dohra Dun, Jhansi, Unao, Fatehpur-Sikri, Almora, Gola Gokaran Nath, Haldwani and Hathras. The aggregate loss on the year's working is Rs.16,507 against a profit of Rs.3,24,180 made last year. The reason for the loss is that the expenditure on maintenance during the year under review includes a sum of Rs.2,31,276 incurred on capital expenditure. Benares and Cawnpore have also paid a sum of Rs.3,56,939 over and above the usual annual payments on account of interest and sinking fund charges on loans outstanding. If the above items had been excluded from the expenditure on maintenance there would have been a profit of Rs.5,71,708 on the undertakings managed by local authorities during the year under review.

MAINTENANCE OF MECHANICAL PLANT AND DISTRIBUTION SYSTEM.

8. The mechanical plant at most of the water works has on the whole been satisfactorily maintained, but this cannot be said of the distribution systems. The record plans in a good many cases have not been kept up to date and it has been found in some towns that the register of connexions has been incorrectly posted. Extensions are usually carried out haphazardly and an area suffering from a shortage of supply is generally relieved at the expense of other areas and the process has then to be repeated.

WASTE PREVENTION MEASURES.

9. Waste prevention measures at the instigation of Government have been taken up in all the towns and the pipeline staffs have been greatly augmented but it is somewhat doubtful if the results obtained up to date have been commensurate with the expenditure involved. The first essential of a water waste detection campaign is suitable operators. These should be strong intelligent men willing to learn the work and to use their hands and prepared to "give and take" on the question of hours worked both during the day or night. Few supervisors are required. All the staff should be competent to undertake minor repair work such as re-washing taps and the changing of meters. It is doubtful if the majority of the staff employed comply with these conditions.

*This includes Rs.3,015 out of grant and Rs.3,58,072 out of loan spent on capital expenditure during the year.

10. The installation of meters, which is a radical remedy for preventing misuse of water, has made slow progress. A loan of Rs 50,000 taken for the purpose by the Lucknow Municipal Board last year has not been utilized and funds of nearly the same amount with the Allahabad Municipal Board are still intact. Benares in the previous year made considerable progress in this direction but it is understood that their efforts in this connection are now being relaxed. The smaller Boards are much better in this respect—all private connexions at Unao are metered and the Hathras Board have fixed 302 meters since the inauguration of the works.

Mr. C. W. Cassé, Waterworks and Mechanical Engineer, with the permission of Government, visited Calcutta early in the year with the primary object of studying the methods adopted in Bengal for restricting waste and controlling consumption. His report will shortly be issued.

11. The acid test of the successful management of a waterworks undertaking is the percentage of water that can be "accounted for" and this should be in the region of 90 per cent. or more in the case of small towns. Applying this test to the undertakings in this province, small towns like Unao, Hathras and Kosi which have acted on the advice of this department and have also installed meters can account for 89.70, 94.54 and 98.50 per cent. respectively of the total water supplied. While the larger towns, e.g. Lucknow and Cawnpore can account for only 53.45 and 47.29 per cent. respectively. It is admitted that it is easier to apply this test to the smaller towns but the figures for the large towns although approximate reveal the tremendous amount of waste that is taking place. For the purpose of comparison the following figures extracted from the report for the year 1935 of the Waterworks Department, Singapore, are of interest:

Population supplied 560,000.

Total supply 15.9 million gallons.

Consumption per head per day for all purposes (in gallons) 28.6.

Percentage of unaccounted for water 8.51.

12. Some Boards seem to be of opinion that their difficulties in regard to shortage of water in outlying districts particularly during the summer months common to all class I municipalities in the plains will be solved if more storage both overhead and underground is provided and the distribution systems are reorganized. This is a fallacy. No doubt that would be some alleviation for two or three years but history would repeat itself, unless meantime steps to reduce excessive consumption on the part of certain consumers were taken and the old conditions would resume.

13. There is difficulty in obtaining suitable technical staff for the maintenance of the waterworks both for the superior and subordinate posts. There are many candidates forthcoming with the academic qualifications specified but nearly all have insufficient practical experience. In the smaller municipalities the Superintendent should be a working engineer, but this type of man is nearly impossible to obtain, so maintenance costs are increased by the employment of mistris and other menial staff because the Superintendent is either not willing or incapable of using his hands.

Difficulty is also being experienced in filling leave vacancies in the smaller towns. The finances of these Boards or the extent of the work in most cases do not justify the employment of a Deputy and under present conditions inter-transfer of staff from one waterworks to another is not possible. There is no doubt that a better type of candidate would be forthcoming and staff could be trained on proper lines if some "Service" was created on the lines introduced by the Government of Madras for Municipal Engineers and Municipal Electrical Engineers.

14. The water supply clauses in the Municipalities Act and the model rules made thereunder are out of date and badly need revision. Many other matters in the administration of the water supply works and the control exercised also require inquiring into. The Board of Public Health are anxious that a representative committee should be appointed to inquire into this and other connected matters and the question is being considered by Government.

DRAINAGE

15. The number of sewage pumping stations remains the same as last year. New stations are under construction at Farmatghat (Cawnpore) and also at Hardwar.

16. Drainage conditions in the large towns in the plains are deteriorating. The aftermath of the floods of 1936 at Lucknow revealed that the drainage system was in a parlous condition, the eastern intercepting sewer was breached in several places and a portion of the western intercepting sewer had collapsed. The tail end of the Ghaziuddin Hyder Canal lining was completely blocked with sludge deposited

METERED SUPPLIES
AND CONTROL.

MANAGEMENT.

SHORTAGE OF
WATER IN OUTLY-
ING AREAS.

WATERWORKS
STAFF.

WATER LAW AND
THE MODEL RULES

NUMBER OF PUMP-
ING STATIONS.

DRAINAGE CONDI-
TIONS.

from the emergency outlet of the eastern intercepting sewer and sewage was backing up in the channel to the Mall Road.

Previous to this catastrophe the Trans-Gumti area and many of the inhabited areas developed by the Improvement Trust were without sewers and the Ghaziuddin Hyder Canal sewer and most of the branch sewers were working to capacity. What virtually amounted to a breakdown of the system and the resulting conditions were brought to the notice of Government and a Drainage Committee was appointed at the beginning of the year to investigate and advise on the measures that should be taken to put things right and their report should shortly be released. The conditions at Cawnpore are about the same as at Lucknow and the Upper India Chamber of Commerce have already pressed the need of an inquiry.

The sewage farm at Allahabad is insufficient to cope with the present discharge and there is always a grave danger of the river being polluted during the time of the annual *melas*. The renewal of the rising main carried on the Jumna Bridge cannot be delayed much longer.

At Benares during the time Mr. J. V. Lynch was Additional District Magistrate in charge of municipal affairs, considerable improvement was effected in the drainage system. The Medical Officer of Health succeeded in desilting considerable lengths of the existing drains with the result that much of the sewage escaping along the river front and polluting the bathing *ghats* was diverted into proper channels. It is hoped that the newly constituted board will continue with the good work.

DEVELOPMENTS.

17. Small drainage schemes have been carried out at Hardoi, Deoria and Dehra Dun, and a comprehensive scheme is in hand for Harwar. The introduction of an underground drainage system is not possible unless an adequate supply of piped water is available and progress in this direction must of necessity be limited to towns having this amenity.

Properly laid out sewage farms are in operation at Lucknow, Allahabad, Muttra and also at Dehra Dun and all are revenue-producing. Sewage is also treated on load at Agra, Kanauj and Mussoorie.

In the large towns particularly in Lucknow and Cawnpore there is some demand for the installation of sanitary fittings. This unfortunately in a good many cases cannot be met for want of sewers, and the intermittent water supply available is also a deterrent.

GENERAL REMARKS

HEALTH WORKS OTHER THAN DRAIN- AGE AND WATER SUPPLY.

18. Progress in health works other than water supply and drainage such as the provision of hospitals, markets, model lodging houses, dispensaries, town planning schemes and the like is slow.

Hospital accommodation for infectious diseases in most towns is deficient.

Grants from Government are seldom, if ever, available in these days of financial stringency and the Boards are reluctant to take loans for such amenities which besides being costly in the first instance also involve heavy recurring expenditure in their maintenance. Detailed proposals were prepared by the department during the year for a municipal infectious diseases hospital for the Allahabad Board comprising administrative block, fever wards for both sexes, block for anti-rabic treatment and quarters for staff. The cost of the comprehensive scheme was estimated at Rs.1,97,694 and the first working instalment at Rs.1,46,519. The Board were willing to finance by loan half the cost and to meet the recurring expenses but requested assistance in the form of grant to meet the balance but it is doubtful if the Board of Public Health will be able to give any assistance.

FIRE FIGHTING APPLIANCES.

19. Since attention was invited in a previous report to the lack of suitable fire fighting appliances and the loss that might ensue to life and property, action has been taken by the larger Boards to supplement and improve their equipment. The Boards in the plains are, however, handicapped by an intermittent water supply and lack of overhead storage and considerable damage is usually caused before the mains can be brought under pressure. A 24 hours continuous supply would be justified for this reason alone, apart from the other advantages, such as prevention of contamination, no necessity to store water, and mains always under pressure, which would also accrue.

MAINTENANCE OF STREETS AND ROADS.

20. A considerable improvement has taken place in recent years in the condition of the main streets and roads in the larger municipalities due to use of tar and bitumen for surface treatment. The Board of Public Health some years ago recognized that dust was a menace to health and encouraged boards by giving grants to treat short lengths of roads as a demonstration. The advantages were so apparent that to meet the public demand many miles of municipal roads have now been treated. One or two municipalities are now embarking on the construction of concrete roads in the thoroughfares subject to extensive traffic conditions and this should be encouraged. The first cost is high but maintenance charges over a period of 20 years are low and the dust nuisance is abated.

21 There is now a big demand among all classes for better housing conditions. The middle classes are no longer content to live in the congested city area and there is a definite drift to the open spaces. The Improvement Trusts in the cities where they have been constituted—Lucknow, Cawnpore and Allahabad—are endeavouring to meet the demand by developing and opening out areas. Unfortunately the provision of drains and sewers has not progressed at the same rate as the building developments and sanitary conditions in many of the new areas are not what they should be. The municipalities in the towns mentioned have this problem to face. Practically no progress has been made by the other municipalities in town planning or the provision of houses for the working classes.

HOUSING
CONDITIONS. COM-

22. The number of municipalities who employ qualified municipal engineers can be counted on the fingers of one hand and as the initiation and preparation of projects for all manner of municipal works must devolve on these officers, little progress is possible until this state of affairs is changed. Sir Tej Bahadur Sapru has remarked that of the skilled professions in India the trained engineer in any branch stands the best chance of employment and the percentage of unemployment amongst this class is the lowest. To attract the best type of man, municipal service must be made more attractive. Local Governments, Railways and private concerns compete with the local authorities for the services of the best men and the former win. The Madras Government have been faced with this difficulty and have introduced a Municipal Engineering Service and the creation of a similar service is advocated for this province.

MUNICIPAL ENGI-
NEERING STAFF.

OPERATIONS OF LOCAL AUTHORITIES

Water Supply—The Board's management of their water supply and drainage works is open to criticism. No serious attempt appears to have been made to enforce the major recommendations that have been made by Officers of this Department at different times. The work of installing meters and demonstrating the methods of waste prevention undertaken by the department, on the definite promise that the Board would abide by the advice tendered, had to be abandoned mainly due to the lack of support forthcoming. This responsibility was assumed by the Board in May, 1936, who with difficulty and in the face of much opposition from the public succeeded in installing about 150 meters by the end of December, 1936. Consequent on the separation of the two distribution zones and the metering of some of the connexions in the low level zone it is anticipated that the scarcity of water experienced in the high zone area will now be mitigated to some extent.

ACRA.

In the rainy season of 1936, a shortage of supply was experienced on two occasions. This was due to algal growth in the filters and the difficulty experienced in treating the turbid river water. An assistant engineer of the department remained at the waterworks for several days on both occasions to render assistance.

Water Supply Reorganization—In accordance with the instructions contained in G. O. no. 2863/XI-224E, dated the 25th September, 1936, a scheme for reorganizing the water supply of the town has now been taken in hand. The Board have decided that a basic figure of 30 gallons per head per day for the supply should suffice and it is expected that the forecast of cost which is now under preparation will show that an expenditure of between ten to fifteen lakhs of rupees will have to be incurred.

The mental hospital at Billochpura which is situated in the high zone area has suffered from the usual shortage of water, and the Board to improve the supply have now installed electro-motor centrifugal boosting pumps. The hospital authorities are considering an independent supply from a tube well and a forecast of cost amounting to Rs.30,135 for this has been submitted.

Maintenance—The Mechanical Engineer's inspection reports disclose that the pumping plant is extremely old and has reached the end of its useful life, in consequence a breakdown is always imminent. The High Duty Worthington Engine has for some years been operating with cracked cylinders and frame and yet the main supply to the town depends primarily on this unit.

Additional filtration plant is also required at the waterworks as the existing filters cannot cope with the demand. One filter remained out of commission during the year under review as the Board had failed to provide funds for the renewal of the filtering media. The accumulation of silt in the settling tanks resulted, when one section was emptied for cleaning, in the collapse of one of the main baffle walls.

Drainage—So far no steps have been taken to deal with the nuisance caused by the discharge of raw sewage into the river. This is a constant menace to the health of the Public. The contamination of the bathing ghats situated along the river bank and the collection of sewage in the vicinity of the Fort has assumed alarming proportions and though numerous recommendations for removing the nuisance have been made, the Board so far have failed to arrange for the requisite funds to proceed with the scheme.

Water Supply—The waterworks are now managed by the firm of Messrs. Noor-ullah Ghaznafarulla under a licence granted by Government under an amendment

ALIGARH WATER
SUPPLY.

to the Municipal Act (28th October, 1930). The supply is said to be ample, and adequate pressure is maintained. All private connexions have been metered.

ALLAHABAD.

Water Supply—The conditions of the water supply as regards shortage in outlying areas in the summer months are still as unsatisfactory as in former years. This Board has been somewhat remiss in taking action on the advice given in regard to the control of waste and the installation of meters. Only 311 meters are in operation but many of these are in a derelict condition and no spare meters are available. The balance of a loan of Rs.50,000 for waste prevention measures has been made available for the purchase of meters but so far no orders have been placed. A complete reorganization of the distribution system is long over-due, as extensions of the town have taken place in areas not contemplated when the water-works were first initiated. However, this should not prevent more rigorous steps being taken in regard to waste prevention. Although the existing plant is capable of providing a continuous supply for 24 hours during the winter months, the Board is reluctant to run the pumps for longer hours, on account of the extra cost involved due to the increased consumption of electricity.

The supply of water available is not equal to the demand in the summer months and the Board should take steps to augment the Khusrubagh pumping station by installing additional units or replace the existing pumps by larger ones. An additional rising main and a fourth pump should also be provided at the Karelalagh unfiltered station in the event of the capacity of the filtered water station being increased. The water purification plant at Khusrubagh will also require reorganization and extension in the near future if the demand continues to increase.

The pumps at the filtered water station at Khusrubagh have apparently never given their rated discharge of 3,750 gallons per minute. A test run by the Department last year revealed that the output was not more than 2,500 gallons per minute.

Due to scarcity of water in the Daraganj area, the Board asked the Department to arrange for a temporary supply for two months during the last hot weather from the existing tube well. The work was carried out at short notice and a sufficiency of water supplied throughout the period. The recommendations of the Waterworks and Mechanical Engineer in regard to improving the supply in this area should receive the attention of the Board.

The mechanical plant both at the filtered and unfiltered stations has been maintained in satisfactory order.

Civil Lines Tube Wells—The sinking of the two new tube wells in the Civil Lines was completed in November, 1935. The Chairman, Municipal Board, has taken exception to the delay that has taken place in the completion of this work. Many factors including the earthquake disturbance in 1934 have been responsible for this. The wells have also been taken down a considerable depth, over 300 feet, and much trouble was experienced both in sinking and the subsequent development.

The contract for the pumping plant consisting of electrically driven borehole pump with accessories has been placed with Messrs. Harland Engineering Company of Calcutta, and that for overhead tank and pipelines with Messrs. P. P. De & Co. of Calcutta. It is hoped that the work, the estimated cost of which amounts to Rs.71,742, will be completed in the autumn of 1937.

Tube Well for Municipal Gardens—A forecast of cost for sinking a tube well for irrigating the municipal garden at Bai-ka-bagh has been furnished to the Board by the Executive Engineer, Well Boring Operations Division. The estimate amounting to Rs.5,300 includes an electrically driven reciprocating deep well pump complete with foundations and kiosk for housing the plant.

Magh Mela Water Supply—Maintenance (Rs.13,851)—The water supply was satisfactorily maintained throughout the *mela* period. The pumping plant was thoroughly overhauled during the year and the necessary spare parts purchased. The demand due to extensive watering of the *mela* roads is increasing every year and the funds allotted are no longer sufficient to meet the requirements.

The trailer fire engine and a road watering lorry loaned by the Allahabad Municipal Board were available throughout the *mela* period. Two outbreaks of fire occurred but both were brought under control within a short time without loss of life and little damage to property.

Magh Mela Electric Supply (Rs.10,268)—The long term contract of Messrs. P. L. Jaitly & Co. was renewed by orders of Government and fresh tenders invited. Messrs. the Universal Engineering Company, Allahabad, were entrusted with the work and they managed to complete it within the scheduled time and succeeded in maintaining it satisfactorily. The installation of three flood lights near the *Sangam* which profusely lighted the bathing area was an innovation much appreciated by the pilgrims.

Infectious Diseases Hospital—Detailed proposals for this were prepared by the 2nd Division at the request of the Board. The cost of the comprehensive scheme is

estimated at Rs.1,97,694 and of the first working instalment at Rs.1,46,519. The proposals are now under consideration by the Board.

Drainage—The situation as regards the drainage system still continues to be most unsatisfactory. Attention is invited to the remarks on this subject in the last year's report. Steps should be taken as soon as possible to re-organize the drainage pumping station on modern lines. The provision of an entirely new rising main cannot be delayed much longer and the extension of the sewage farm is also a necessity in view of the pollution of the river that takes place during the annual *melas*. It is understood that the Board have these matters under consideration and it is hoped that definite proposals will be submitted shortly.

Allahabad District Public Works Department Works—A review of the progress made during the year in connexion with the maintenance of the Public Works Department works under this department's system of contract has not been included in this year's report. This information will be supplied to the Chief Engineer, Public Works Department, Buildings and Roads Branch, for inclusion in his Annual Administration Report as directed in G. O. no. 957/MS/217/MS/252, dated the 7th December, 1936.

Miscellaneous Works—Several miscellaneous works such as extensions to the office building of the Executive Engineer, 2nd Division, costing Rs.1,000, annual repairs to office and residence of the Executive Engineer and maintenance of electric installation in both premises were undertaken and completed during the year.

Water Supply—This town is badly off for water due to the restricted discharge from the springs particularly during the summer months. The Waterworks and Mechanical Engineer in his inspection reports has made various suggestions for augmenting the supply and these have been brought to the notice of the Board. A superabundant supply will only be possible by making use of river water and this will involve both heavy capital and recurring charges as pumping on a large scale will have to be resorted to. If a hydro-electric grid system for the Kumaun Hills ever matures, a pumping scheme is within the bounds of possibility, otherwise not. The maintenance of the pipe line from the Shahi Devi hills on which the bulk of the supply to the town depends has not been satisfactory. It is essential that this steel main should be thoroughly and periodically painted, otherwise rust and corrosion will take place and this will involve replacements on a large scale.

ALMORA.

A tube well affording a supply of 325 gallons per minute with a depression head of 17 feet was completed in the year 1931 and a second well yielding 286 gallons per minute with a depression of 35 feet in 1935. The nucleus of a water supply scheme is therefore available and its development is extremely desirable in view of the "All India" importance of Ajodhya as a pilgrimage centre. It is again recommended that the Fyzabad Municipal Board should consider ways and means of financing the scheme.

AJODHYA
(DISTRICT FYZABAD).

Water Supply (Rs.50,050)—This town with a population of 7,100 has been supplied with a forecast of cost for a public water supply. It is, however, extremely doubtful, unless some assistance is forthcoming from Government or the Board of Public Health, whether the scheme will be proceeded with.

AURAIYA
(ETAWAH DISTRICT.)

Dargah Syed Salar Fair Water Supply—The forecast of cost for providing a permanent water supply to the fair which is held annually in May and June was approved by the Committee. A detailed estimate amounting to Rs.37,920 has been prepared and forwarded to the Committee for approval.

BAHRAICH.

Infectious Diseases Hospital (Rs.10,000)—A forecast of cost for this is under preparation by Executive Engineer, 2nd Division, Public Health Department, and will shortly be submitted to the Board for consideration.

BAREILLY.

Surface Drainage Improvement—The drains on both sides of the roads were inspected in June, 1936, by an Assistant Engineer of this department and at the request of the Chairman another inspection will be made shortly when a forecast of cost will be prepared and submitted for consideration.

BASTI.

Water Supply Maintenance—This Board has undertaken waste prevention measures with some degree of success and the Waterworks Superintendent is to be congratulated on the results achieved. Strenuous efforts have been made to reduce waste and misuse of water, meters being installed in cases considered necessary. The result has been that during the winter months in most districts the hours of supply have been increased from 9½ to 16 hours per day. And in spite of the additional water supplied during the longer hours, the savings made in the total consumption have resulted in little or no increase in the consumption of electricity for pumping. There is no doubt that the measures adopted up to date have proved effective and if continued with on the same lines should reduce considerably the percentage of "unaccounted for" water. It should be possible to extend the supply hours still further if the proposal of the Waterworks Superintendent to instal a pump

BENARES.

to the Municipal Act (28th October, 1930). The supply is said to be ample, and adequate pressure is maintained. All private connexions have been metered.

ALLAHABAD.

Water Supply—The conditions of the water supply as regards shortage in outlying areas in the summer months are still as unsatisfactory as in former years. This Board has been somewhat remiss in taking action on the advice given in regard to the control of waste and the installation of meters. Only 311 meters are in operation but many of these are in a derelict condition and no spare meters are available. The balance of a loan of Rs.50,000 for waste prevention measures has been made available for the purchase of meters but so far no aid has been placed. A complete reorganization of the distribution system is long over-due, as extensions of the town have taken place in areas not contemplated when the water-works were first initiated. However, this should not prevent more rigorous steps being taken in regard to waste prevention. Although the existing plant is capable of providing a continuous supply for 24 hours during the winter months, the Board is reluctant to run the pumps for longer hours, on account of the extra cost involved due to the increased consumption of electricity.

The supply of water available is not equal to the demand in the summer months and the Board should take steps to augment the Khusrubagh pumping station by installing additional units or replace the existing pumps by larger ones. An additional rising main and a fourth pump should also be provided at the Karslabagh unfiltered station in the event of the capacity of the filtered water station being increased. The water purification plant at Khusrubagh will also require reorganization and extension in the near future if the demand continues to increase.

The pumps at the filtered water station at Khusrubagh have apparently never given their rated discharge of 3,750 gallons per minute. A test run by the Department last year revealed that the output was not more than 2,500 gallons per minute.

Due to scarcity of water in the Daraganj area, the Board asked the Department to arrange for a temporary supply for two months during the last hot weather from the existing tube well. The work was carried out at short notice and a sufficiency of water supplied throughout the period. The recommendations of the Waterworks and Mechanical Engineer in regard to improving the supply in this area should receive the attention of the Board.

The mechanical plant both at the filtered and unfiltered stations has been maintained in satisfactory order.

Civil Lines Tube Wells—The sinking of the two new tube wells in the Civil Lines was completed in November, 1935. The Chairman, Municipal Board, has taken exception to the delay that has taken place in the completion of this work. Many factors including the earthquake disturbance in 1934 have been responsible for this. The wells have also been taken down a considerable depth, over 300 feet, and much trouble was experienced both in sinking and the subsequent development.

The contract for the pumping plant consisting of electrically driven borehole pump with accessories has been placed with Messrs. Harland Engineering Company of Calcutta, and that for overhead tank and pipelines with Messrs. P. P. De & Co. of Calcutta. It is hoped that the work, the estimated cost of which amounts to Rs.71,742, will be completed in the autumn of 1937.

Tube Well for Municipal Gardens—A forecast of cost for sinking a tube well for irrigating the municipal garden at Bai-ka-bagh has been furnished to the Board by the Executive Engineer, Well Boring Operations Division. The estimate amounting to Rs.5,300 includes an electrically driven reciprocating deep well pump complete with foundations and kiosk for housing the plant.

Magh Mela Water Supply—Maintenance (Rs.13,851)—The water supply was satisfactorily maintained throughout the *mela* period. The pumping plant was thoroughly overhauled during the year and the necessary spare parts purchased. The demand due to extensive watering of the *mela* roads is increasing every year and the funds allotted are no longer sufficient to meet the requirements.

The trailer fire engine and a road watering lorry loaned by the Allahabad Municipal Board were available throughout the *mela* period. Two outbreaks of fire occurred but both were brought under control within a short time without loss of life and little damage to property.

Magh Mela Electric Supply (Rs.10,268)—The long term contract of Messrs. P. L. Jaitly & Co. was renewed by orders of Government and fresh tenders invited. Messrs. the Universal Engineering Company, Allahabad, were entrusted with the work and they managed to complete it within the scheduled time and succeeded in maintaining it satisfactorily. The installation of three flood lights near the *Sanyam* which profusely lighted the bathing area was an innovation much appreciated by the pilgrims.

Infectious Diseases Hospital—Detailed proposals for this were prepared by the 2nd Division at the request of the Board. The cost of the comprehensive scheme is

estimated at Rs.1,97,694 and of the first working instalment at Rs.1,46,519. The proposals are now under consideration by the Board.

Drainage—The situation as regards the drainage system still continues to be most unsatisfactory. Attention is invited to the remarks on this subject in the last year's report. Steps should be taken as soon as possible to reorganize the drainage pumping station on modern lines. The provision of an entirely new rising main cannot be delayed much longer and the extension of the sewage farm is also a necessity in view of the pollution of the river that takes place during the annual *melas*. It is understood that the Board have these matters under consideration and it is hoped that definite proposals will be submitted shortly.

Allahabad District Public Works Department Works—A review of the progress made during the year in connexion with the maintenance of the Public Works Department works under this department's system of contract has not been included in this year's report. This information will be supplied to the Chief Engineer, Public Works Department, Buildings and Roads Branch, for inclusion in his Annual Administration Report as directed in G. O. no. 957/MS/217/MS/252, dated the 7th December, 1936.

Miscellaneous Works—Several miscellaneous works such as extensions to the office building of the Executive Engineer, 2nd Division, costing Rs.1,000, annual repairs to office and residence of the Executive Engineer and maintenance of electric installation in both premises were undertaken and completed during the year.

Water Supply—This town is badly off for water due to the restricted discharge from the springs particularly during the summer months. The Waterworks and Mechanical Engineer in his inspection reports has made various suggestions for augmenting the supply and these have been brought to the notice of the Board. A superabundant supply will only be possible by making use of river water and this will involve both heavy capital and recurring charges as pumping on a large scale will have to be resorted to. If a hydro-electric grid system for the Kumaun Hills over matures, a pumping scheme is within the bounds of possibility, otherwise not. The maintenance of the pipe line from the Shab Devi hills on which the bulk of the supply to the town depends has not been satisfactory. It is essential that this steel main should be thoroughly and periodically painted, otherwise rust and corrosion will take place and this will involve replacements on a large scale.

ALMORA.

A tube well affording a supply of 325 gallons per minute with a depression head of 17 feet was completed in the year 1931 and a second well yielding 286 gallons per minute with a depression of 35 feet in 1935. The nucleus of a water supply scheme is therefore available and its development is extremely desirable in view of the "All India" importance of Ajodhya as a pilgrimage centre. It is again recommended that the Fyzabad Municipal Board should consider ways and means of financing the scheme.

AJODHYA
(DISTRICT FYZABAD).

Water Supply (Rs.50,050)—This town with a population of 7,100 has been supplied with a forecast of cost for a public water supply. It is, however, extremely doubtful, unless some assistance is forthcoming from Government or the Board of Public Health, whether the scheme will be proceeded with.

AURAIYA
(ETAWAH DISTRICT).

Dargah Syed Salar Fair Water Supply—The forecast of cost for providing a permanent water supply to the fair which is held annually in May and June was approved by the Committee. A detailed estimate amounting to Rs.37,920 has been prepared and forwarded to the Committee for approval.

BAHRAICH.

Infectious Diseases Hospital (Rs.10,000)—A forecast of cost for this is under preparation by Executive Engineer, 2nd Division, Public Health Department, and will shortly be submitted to the Board for consideration.

BAREILLY.

Surface Drainage Improvement—The drains on both sides of the roads were inspected in June, 1936, by an Assistant Engineer of this department and at the request of the Chairman another inspection will be made shortly when a forecast of cost will be prepared and submitted for consideration.

BASTI.

Water Supply Maintenance—This Board has undertaken waste prevention measures with some degree of success and the Waterworks Superintendent is to be congratulated on the results achieved. Struonous efforts have been made to reduce waste and misuse of water, meters being installed in cases considered necessary. The result has been that during the winter months in most districts the hours of supply have been increased from 9½ to 16 hours per day. And in spite of the additional water supplied during the longer hours, the savings made in the total consumption have resulted in little or no increase in the consumption of electricity for pumping. There is no doubt that the measures adopted up to date have proved effective and if continued with on the same lines should reduce considerably the percentage of "unaccounted for" water. It should be possible to extend the supply hours still further if the proposal of the Waterworks Superintendent to instal a pump

BENARES.

BENARES—(concluded) to operate under a low head is proceeded with. The cost of the new unit will be about Rs.10,000.

The filtration plant is now too small for the needs of the town and should be extended and reorganized. Various proposals have been considered but so far the Board have not arrived at a decision. Booster pumps have been installed for increasing the pressure in certain isolated high level areas and have proved successful. During the year two 30" venturi meters have been purchased and installed. The unfiltered water mains have been extended at several places and this has effected some saving of the filtered water which was formerly used in these areas for road watering. Two centrifugal pumps directly coupled to electric motors with a capacity of 4,000 and 6,000 gallons per hour against a total head of 2'5 feet were purchased and installed during the year for increasing the unfiltered supply for non-domestic purposes.

The mechanical plant both at the filtered and unfiltered water pumping stations has been maintained in first class order and the Waterworks Superintendent has introduced many improvements. The reports from the Mechanical Engineer regarding the condition of the plant are invariably satisfactory.

Water Supply Rapid Gravity Filtration Plant (Rs.3,07,132)—A detailed project comprising 4 units of rapid gravity filters with coagulation tank and the necessary mains, etc. was prepared during the year and submitted to the Board for consideration.

Trial bores at Tulsighat (Rs.1,825)—At the request of the Collector of Benares an estimate was furnished for sinking trial bores to ascertain the nature of the strata to enable suitable foundations for Tulsighat which was damaged during the last floods to be designed. Funds to run the work have not yet been provided.

Drainage—Considerable progress was made during the year in discharging some of the main existing drains with the result that the escape of sewage at various points along the river front has been reduced. However, there is no doubt that there are certain areas that cannot be drained into the existing drainage system and the construction of a few automatic sewage pumping stations will have to be embarked on if the defilement of the river front is to be completely stopped.

During the year the following sewers have been constructed by the Board at a cost of about Rs.18,000 the Dahmandi sewer and sewers at Nakhas, Manarwar and Kamangarha.

BIJNOR.

Drainage—A forecast of cost amounting to Rs.7,900 (first instalment) was furnished to this Board in November, 1935, but no further developments have taken place.

BRINDABAN (Mutua District).

Water Supply (Estimated cost Rs.17,338)—After investigations extending over a number of years, it was finally decided to construct three tube wells along the bank of the river Juam. All the three wells have now been completed and a combined yield of about 152 gallons per minute is available. This quantity should suffice to meet the requirements of the town at present. Unfortunately the bacteriological tests have not been quite satisfactory and it will be necessary to sterilize the water before it is made available for domestic use.

CAWNPORE.

Water Supply Maintenance—This Board have installed more meters than any other municipality in the province. There is, however, a water shortage in many areas which becomes acute in the summer months. The town is rapidly developing and the present supply is inadequate. A complete reorganization scheme is, therefore, essential and the Board have recognized this and have issued instructions to Messrs Brasby Williams and Temple, Chartered Civil Engineers, Calcutta and London to prepare detailed proposals. However, unless steps are taken to prevent excessive consumption on the part of certain domestic consumers either by metering on a more extensive scale or the adoption of the decentralized storage system, the reorganized scheme will not ensure an equable or ample supply to all consumers.

The waterworks pumping plant was maintained in satisfactory condition throughout the year and the staff responsible deserve credit for giving an uninterrupted supply during all seasons, considering the limited capacity of the plant.

Cantonment Water Supply—A forecast of cost was prepared at the request of the Executive Officer, Cawnpore Cantonment, to improve the yield of the existing well in Harisonganj, but the proposals have been dropped for want of funds.

Cawnpore Main Drainage—Permatghat Sewage Pumping Station Reorganization (Rs.1,55,135)—The contracts for the buildings and the supply and erection of pumping plant were eventually placed with the firms recommended by this department. Progress has, however, been slow due to a difference of opinion between the Board and the department regarding the acceptance of other than the lowest tender. The work is now well in hand and it is hoped that it will be completed within the scheduled time. The drainage of Cawnpore and the adjacent districts is now becoming acute. Conditions here are just as bad if not even

worse than at Lucknow. Several authorities are concerned in the matter and they should get together and consider ways and means of tackling the problem.

Water Supply—The work in connection with the Bandal Nadi scheme and the extensions to the distribution system is well in hand and should be completed before the break of the monsoon. The Board have entered into an agreement with the Irrigation Department for the supply of 375 gallons per minute of the Bandal river water at an annual charge of Rs.5,000. The Board have recognized that the present distribution system will require considerable reorganization and extensions if full benefits are to be obtained from the Bandal supply. At their request a forecast of cost for the work involved was prepared by the Executive Engineer, 1st Division, Public Health Department. The cost was estimated at Rs.4,52,463, an amount which the Board were not prepared to finance. The proposals were therefore modified and the cost brought down to Rs.2.50 lakhs and a detailed project has been submitted and the Board are considering ways and means of financing the proposal.

DEHRA DUN.

The supply from Kolukhet and other springs was the cause of some anxiety during the last monsoon when the pipe line was swept away on several occasions by heavy floods. Repairs, however, were quickly executed and the Board have made the best use of the limited supply available.

This Board have very wisely decided to meter all private connexions and the success of the undertaking is now assured.

Drainage—A grant of Rs.10,000 was made by the Board of Public Health on the condition that the Municipal Board provided Rs.5,000 from their own funds for carrying out a further instalment of the Lakhbagh drainage for which a sanctioned project already exists, stipulating at the same time that the unfinished portion, if any, should subsequently be completed by the Board themselves as and when funds become available. This portion of the drainage system has now been satisfactorily completed by the Board's own staff. The western portion of the town is still, however, in a very insanitary condition and although the Board's attention has been repeatedly drawn to this undesirable state of affairs, no steps have been taken so far to improve matters.

Sewage Farm—The work of carrying out extensions to the existing sewage farm was entrusted to the Executive Engineer, 1st Division, and has been satisfactorily completed and handed over to the Municipal Board.

The total area comprised in the sewage farm is now about 20 acres and the cultivation rights have been leased for one year.

The rental value Rs.1,500 realized in the first instance is very encouraging and it is hoped that on the expiry of the present tenure, the farm will command a higher rent. The annual income of Rs.1,500 is equivalent to 6 per cent. on an investment of Rs.24,988 which is decidedly a good return on the capital expenditure involved on laying out the farm.

The area will have to be considerably extended in the near future due to the increased flow of sewage consequent on the completion of the water supply and drainage extensions at present in hand.

Drainage (Revised estimate Rs.22,923)—The works were completed and handed over to the local authority on May 23, 1936.

DEORIA.

Dewa Fair Water Supply (Rs.57,859)—The work was completed and finally handed over to the Mela Committee in 1936. The Committee have entered into an agreement with the firm of Messrs. Noorulla Ghazanfarulla of Allahabad who have agreed to take over the maintenance of the plant and to provide a regular supply of water during the mela period.

DEWA
(BARA BANKI).

Extension of pipe line to Durgah (Rs.6,660)—A scheme for extending the pipe line from the Dewa Fair pumping station up to the Durgah has been prepared. The estimate includes for 4" and 3" pipe lines with necessary sluice and scour valves and also the provision of five service tanks each of 400 gallons capacity.

Water Supply (Rs.1,74,712)—The modified scheme which has been prepared and forwarded to the Board for approval and to arrange for the necessary funds has been designed with a view to admit of possible expansions in the future; it provides for two tube wells fitted with the borehole submersible type of pumping plant capable of supplying the present demand. Instead of cast iron standposts, reinforced concrete street tanks have been provided so as to reduce waste.

ETAWAH.

Water Supply—These waterworks were originally constructed primarily for the convenience of pilgrims attending the mela, but they have also adequately served the requirements of the resident population of this small town. It has been suggested that the railway waterworks might be combined with the Notified Area Committee's undertaking. Apart from being economical and mutually beneficial this arrangement would result in an improved supply. The plant was maintained satisfactorily during the year and no major repairs were found necessary.

FATEHPUR SIEMI.

FYZABAD.

Water Supply Extensions—The sump well in connection with the new tube well which was sunk last year has been completed. The contract for the pumping machinery has been placed with Messrs. Jessop and Co. of Calcutta and the plant is in process of erection. The work is estimated to cost Rs.25,138.

Maintenance—This Board frequently disregards advice tendered from time to time by officers of this department in regard to its water supply undertaking. In spite of the fact that there is scarcity of water in the town and the hours of supply are short, the Board do not show any enthusiasm to improve matters by introducing waste prevention measures. On the contrary they are opposed to metering and to any form of restriction. Neither does the Board comply with the rules prescribed in the Municipalities Act relating to the testing of meters and of water supply pipes and fittings; they maintain that there is a condition of financial stringency in spite of the fact that profits on the waterworks are realized from year by year. The Waterworks and Mechanical Engineer has explained that if the undertaking was managed on sound lines, not only would the profits increase appreciably but the Board would be in a position to extend the supply to Ajodhya which is very desirable specially during the *melas*. The Board realizes a sum of Rs.40,000 per annum from pigri or tax and a fair portion of this could be allocated for providing additional water facilities to the pilgrims visiting the sacred town of Ajodhya.

GHAZIPUR.

Water Supply (Rs.3,06,588)—The construction of a masonry tower for supporting one of the storage reservoirs, the erection of Waterworks Superintendent's office and godown as well as the laying of the rising and distribution mains have been completed. The construction of the elevated reservoir at Kot has been put in hand and the order for the pumping plant will shortly be placed. An expenditure amounting to Rs.62,263 has been incurred during the year against an estimate of Rs.2,14,120 for the first working instalment.

This town is in the eastern grid area, the development of which is now under consideration by the Hydro-electric Branch of the Irrigation Department. The question of granting licences for the supply of electric energy has therefore been postponed by Government for the time being until the hydro electric proposals have matured. In consequence an order for only one pumping unit to be driven by an oil engine has been placed. And it has been arranged with the Irrigation Department in the event of the grid system being extended to the town that they will purchase the unit, so the Board will not be put to a loss in installing electric-motor pumping plant.

GOLA GOKARAN-NATH.

Water Supply Maintenance—The water supply was originally inaugurated with a view to supplying drinking water to the pilgrims attending the *melas*, but for some years past it has also been affording some supply to the town, there being some standposts and a few metered connections.

The management of the waterworks is in the hands of the District Board who do not provide sufficient funds for its proper maintenance, the result is that the plant though in duplicate is not worked to the best advantage. Improvement in the yield of the tube well as well as the quality of water supplied is necessary and the installation of a sterilizing apparatus has also been recommended.

The plant in spite of being old has for some years successfully supplied both the public and the pilgrims visiting the *melas* with a sufficiency of water but this happy state of affairs cannot be expected to continue indefinitely and measures for augmenting the supply should receive early attention. If part of the income derived from the fair funds were apportioned to this undertaking, no additional funds would be required to carry out the necessary improvements.

GONDA.

District Jail Tube Well—As the yield from this well during the summer months has decreased due to the drop in the sub-soil water and in view of its bad state of repairs, an estimate for the construction of a new well in which a 24" tube will be sunk has been prepared and submitted to the Jail authorities. The total cost is estimated at Rs.2,400.

GORAKHPUR.

Drainage Extension. II instalment (Rs.20,335)—An estimate amounting to Rs.20,335 providing for the construction of surface drains in the hospital area and the construction of parapet or retaining walls on the newly constructed storm water drain has been sanctioned. Tenders for the work were opened by the Chairman, Municipal Board, and the lowest, that of Messrs. Kishori Lal Gupta, accepted. The work will be put in hand shortly.

HALDWANI.

No advance in improving the water supply to Haldwani-cum-Kathgodam has been made by the Notified Area. A water tax is not levied and the Notified Area plead shortage of funds when asked to undertake any badly needed improvements. The standard of purity of the water supplied continues to be unsatisfactory but proposals for improving its potability are under investigation. In spite of a continuous supply, waste is still prevalent and little effort has been made to deal with the problem. The average supply of 13 gallons per head is more than sufficient to meet the public requirements but there are complaints of scarcity in

the summer months due to the diminished supply reaching the headworks. The water available, however, is not used to the best advantage due to the excessive waste that takes place.

The Committee, although anxious to inaugurate an electric supply, has not been successful in coming to terms for a bulk supply from Naini Tal, who have no surplus to spare. The desirability of introducing a grid system to serve Kumaun has been brought to the notice of Government.

Drainage : I Instalment—The works were completed and handed over to the municipal board in December, 1936, in good order. The estimate as revised for this instalment amounts to Rs 84,535 and a total expenditure of Rs 81,613 has been incurred on the work during the year.

HARDOI.

Drainage Extension : II Instalment (Rs.78,651)—An estimate providing for surface drains in blocks A, B and C and 2 main intercepting sewers discharging into two sumps and appurtenant works is under preparation.

Water Supply—No further developments in regard to the provision of new waterworks have taken place during the year although estimates and proposals were furnished long ago. This town suffers periodically from epidemics.

HAPUR.

Water Supply Maintenance—Some repairs to no. 3 tube well were found necessary and these were satisfactorily carried out. The fourth tube well was flooded during the heavy rains. This caused some slight damage to the electrical apparatus, which was quickly put right. The supply, however, from this source has been stopped due to unsatisfactory bacteriological analyses and the question of chlorination is under consideration. A new chlorinating plant has been installed at the Tibri reservoir, but the installation of an additional sterilizer to deal with the water from the fourth tube well should not be delayed.

HARDWAR.

The Waterworks and Mechanical Engineer has from time to time advised the entertainment of additional technical staff and the provision of meters on all leading mains so that the total supply to the town can be accurately recorded.

Suggestions for improving the yield from the old tube wells have also been made but so far the board have not been able to arrive at any decision.

Improvements to Har-ki-Pairi (Rs.1,95,528)—The construction of a reinforced concrete bridge which formed part of the above scheme was completed and handed over in 1935. Although a tender for the remaining work was accepted in November, 1936, construction could not be started until January, 1937, owing to the board's inability to acquire the houses which had been scheduled for dismantlement. It is essential that this work be completed before the next Kumbh Mela which takes place in April, 1938, and strenuous efforts are being made by the Executive Engineer, 1st division, to expedite progress but much rock cutting is necessary and the task will not be an easy one.

A portion of Bhimgoda Road near Har-ki-Pairi also badly requires regrading if accidents are to be avoided in the future. The municipal board have approved the proposals for its improvement and the construction will be taken up along with the Har-ki-Pairi improvement.

Drainage (Rs.6,19,453)—The total cost of the combined project for an underground drainage system and a sewage farm including considerable surface drainage work, street paving and water flushed latrines amounted to Rs.6,19,453. Tenders for the work were invited and the contract given to Rai Bahadur Seth Chandi Ram Verhounal Daultani, whose tender was the lowest. As the Board were not in a position to finance an expenditure exceeding Rs.5 lakhs, the amount available in the form of loan and grant from Government, it was proposed to postpone the construction of water flushed latrines but owing to the low tender received due to keen competition, it may be possible to complete practically the whole of the work included in the project with the funds available. The work is well in hand. The contract for the pumping plant has been placed with Messrs. Jessop & Co. of Calcutta.

Drainage of Bhimgoda (Hardwar)—As the natural slope of this area of the town is towards the north, it is not possible to arrange for its drainage to discharge into the main sewers now under construction without resorting to pumping. And as the pollution of the Ganges cannot effectively be prevented unless the drainage of this portion is dealt with, it has been suggested that this work should proceed simultaneously with the Hardwar Drainage Scheme. A forecast amounting to Rs.50,000 of the work necessary has been prepared and submitted to the Board, who have not yet come to any decision on the proposal.

Town Planning of Bhopatwala and Training of Bagh Rao at Hardwar—A project for the above work amounting to Rs.96,451 has received the sanction of the Board of Public Health.

The Hardwar board have asked this department to construct the reinforced concrete bridge at Bagh Rao Badi on the Hardwar-Rikhikesh road which forms part

of this project. The estimated cost of this portion of the work is Rs.12,482 and contract documents have been prepared and tenders invited as the work is one of great urgency and must be completed before the next Kumbh Mela.

HATHRAS.

Water Supply Maintenance—The second year of the working of Hathras water-works shows a considerable increase in the number of private connexions all of which have been metered. The first year's working of the undertaking resulted in a deficit, as no water-tax was imposed. The board in spite of local opposition have now agreed to levy a 2½ per cent. water-tax, which should improve the situation to some extent. Unless the undertaking is made self-supporting, further developments are not possible. The supply from one of the tube wells shows signs of pollution and necessary steps to instal a sterilization apparatus have been taken.

As ample savings were effected in the construction of this water supply, it has been possible to carry out certain additional works such as the installation of a venturi meter on the rising main, an electric level indicator on the balancing tank, the fixing of name plates indicating the position of valves and other fittings on the distribution system. These works are being carried out under a separate estimate but the cost will be met from the savings on the original estimate.

Drainage—The inauguration of a piped water supply in the town has accentuated the need for a proper drainage system. Proposals for such a scheme are now under consideration. Preliminary savings have been completed and the preparation of a forecast of cost is in hand.

JAUNPUR.

Water Supply. (Rs.2,12,829)—The works were completed and handed over to the municipal board in good running order in February, 1937, but some water was made available to the inhabitants as early as November, 1936. In the beginning the quality of water was not considered to be up to the requisite standard of purification but from January last the results from the samples analysed have almost invariably been satisfactory. The board have been instructed to maintain detailed statistics as required by this department from 1st April, 1937. If a sufficient water-tax is imposed and all private connexions are metered, there need be no apprehension of a deficit on this undertaking.

JHANSI.

Water Supply Maintenance—The existing water supply system at Jhansi is insufficient to meet the increasing demand and requires reorganization. The pumping plant is uneconomical and is practically worn out. The quality of water is also not always up to the standard of purification required by the Director of Public Health and there are many inequalities in the distribution system which should be rectified. The Waterworks and Mechanical Engineer has recommended the adoption of meters and other devices to conserve the supply, but a complete reorganization of the whole system is long overdue. The Superintending Engineer visited the town early in the year and examined various alternatives for supplementing the supply but eventually advised the board to continue with the supply from the Pahuj reservoir.

Water Supply Extensions (Rs.55,588)—A new masonry service reservoir was completed and handed over to the board in good running order on 28th May, 1936. This reservoir also acts as a coagulating and settling tank, and the water is chlorinated with the result that the supply has improved in the zone served from this source.

Civil Lines Service Reservoir—A forecast of cost amounting to Rs.46,408 has been prepared and furnished to the board for the construction of an additional storage reservoir for the supply to Civil Lines.

Drainage—There is no further development to report in connection with the drainage scheme which the board have had under consideration since last year.

Vegetable Market—Two alternative forecasts were prepared and forwarded to the municipal board for approval.

Alternative no. I provides for the remodelling of the existing stalls and the construction of new stalls and a masonry compound wall at an estimated cost of Rs.20,450. Alternative no. II estimated to cost Rs.12,200 provides for the reconstruction of stalls for Kachis and Kunjras.

KOSI.

Water Supply Maintenance—This notified area has succeeded in inaugurating a 24 hours continuous supply and night tests reveal that little or no waste takes place. The night flow is only about 1 per cent. of the day flow and this can be attributed to proper control and the legitimate use of water by the public. Almost all the domestic connexions have been metered and this notable achievement is worthy of emulation by other local authorities.

The Waterworks and Mechanical Engineer has laid emphasis on the necessity of duplicating the tube well and pumping plant, as there is no standby and the supply would fail in the event of a breakdown of the existing oil engine and pump. The project for an additional tube well and pumping plant is under preparation and will shortly be submitted.

Water Supply Maintenance—The mechanical plant has been maintained in satisfactory condition and the supply was uninterrupted during the floods of last year although the river level nearly reached the threshold of the riverside pumping station. The Board have embarked on a big programme of capital works, which are scheduled to be completed within the next few years. The following works are in hand: the construction of an additional clear water reservoir, the laying of a new ring main for improving the supply in areas where there is now a deficiency and the construction of three open sand filters. The capital works referred to are being carried out under the supervision of Messrs Lane Brown and Hewlett, Consulting Engineers, Lucknow. The Board are attempting to grapple with the problem of waste prevention, but there has been no diminution in the supply per capita. A loan of Rs.50,000 for the purchase of meters was sanctioned last year but although tenders were opened some months ago and a comparative statement prepared no order has yet been placed for the supply.

The average consumption of water per head per day in Lucknow is nearly 45 gallons, the highest in the province, and in spite of the fact that Cantonments no longer take a bulk supply the demand is such that it cannot be met. There is a complaint of water shortage in the summer months in practically all the outlying districts.

The large extensions now in hand may for a limited time afford some relief but the inequalities in the distribution and shortage in certain areas will persist unless improved waste prevention measures are introduced and rigorously applied.

This Board a few years ago had good intentions in regard to introducing measures for control but lately their efforts appear to have relaxed.

Trial Tube Well fitted with Ess-bee Patent Coir Strainer at Lucknow (Rs.12,293)—A motor driven borehole pump supplied by Messrs. Scotts and Saxby of Calcutta has been installed in the trial tube well which was sunk in 1935. On test in October, 1936, a discharge of about 150 gallons per minute with a depression head of 24 feet was obtained and the water was found to be free from sand.

Anti-Malaria and Drainage Works, Ghazi-ud-din Hyder Canal Lining and Sewer Maintenance—The maintenance during the year was carried out on contract.

Owing to the extensive floods the sub-soil water level in the area of the canal lining remained abnormally high and much seepage resulted and extensive P. C. pointing, plastering and repair work had to be undertaken. The expenditure on maintenance amounted to Rs.7,685 during the year.

Special repairs to Ghazi-ud-din Hyder Canal Lining and Outfall—Due to the abnormal rise in the level of the river Goomti, which continued for a period of 2 to 3 months, and the breaches in the western intercepting sewer, which resulted in the emergency outfall coming into operation and discharging into the tail end of the lining, a considerable length became silted up so much so that the flow backed up to Government House. Complaints of the unhealthy conditions caused by this state of affairs became rife and the work of making a diversion cut and desilting a considerable length of the lining had to be taken in hand. This was carried out within the estimate of Rs.6,000.

Maintenance of Goomti Weir—The maintenance of Goomti Weir was as usual carried out departmentally at a cost of Rs.1,580. Special repairs which involved the raising of the approach road by 4 feet and the filling of cavities with block kankar were found necessary after the floods. These were carried out at a cost of Rs.569.

Special Repairs to Goomti Weir (Rs.21,000)—Owing to the continuous floods during the months of August and September, 1936, it was found that the foundations of the weir both up-stream and down stream had been badly scoured and the whole structure endangered. The advice of the Irrigation Department was taken, both Mr. Lyle, Chief Engineer and Mr. Bradshaw Smith, Superintending Engineer, visiting the site. Extensive repair work was recommended and an estimate is under preparation and work will be taken in hand before the rains of 1937.

Drainage—Both the eastern and western intercepting sewers breached during the floods. Permanent repairs have been carried out to the eastern intercepting sewer and an estimate for temporary repair works to the western intercepting sewer mainly to ensure the safety of the Bund has been prepared by the Board's Consulting Engineers.

For some years past the drainage system of Lucknow has been in a most unsatisfactory condition and many complaints both from official and unofficial sources have been lodged. The trouble came to a head after the floods of last year when the major portion of the system broke down resulting in the sanitary conditions in some parts of the town becoming intolerable. The conditions have not been improved by the Improvement Trust developing areas in places where no provision

exists for the disposal of the drainage. Government appointed a Drainage Committee in March, 1957 to enquire into the conditions and make recommendations for improvement and their report should be available shortly.

MEEHUT.

Water Supply Maintenance—This municipality succeeded in maintaining a 24 hour continuous supply for a short period in some districts, but there are still certain areas which do not receive their full normal share of the water available. This shortage is particularly noticeable in Civil Lane, so much so that the Meerut College have installed their own supply. In order to meet the increasing demand it is necessary that certain additional work of a capital nature such as the construction of additional storage tanks, gradual renewal of the waterworks pumping plant, extension of the waterworks distribution system, particularly the provision of a feeder main so that all service connections can be disconnected from the main system, should be taken in hand. The Board do not levy a water tax, and have paid off all loan charges. If a tax was imposed ample funds would be available for extension and reorganization of the distribution system. The consumption per head is given at 14 H. gallons per day, but it is assumed that a considerable quantity of water is accounted for. Another reason for the low figure of consumption is that the population adequately served by the supply is overestimated. The Waterworks and Mechanical Engineer has given detailed advice for controlling water, which if followed would give improved results. Only one plumber has been licensed at Meerut, a state of affairs which is most unsatisfactory. The Board have been repeatedly advised to end this monopoly but it still continues. The 75 connections which are on the main, main have not been metered as advised, neither have any steps been taken to provide a meter main. No action has been taken regarding the metering of non-domestic connections and those domestic connections served by communication pipes over 1 inch diameter.

The condition of the plant has been improved and on the whole is maintained satisfactorily, but the administration particularly as regards the distribution system leaves much to be desired.

A tube well which was contracted in February, 1952 and which on test yielded 660 gallons per minute with a depression head of only 9 feet has never been brought into commission. The Superintendent, Waterworks has been provided with a forecast of cost amounting to Rs. 2,000 for changing this well and testing its yield but no decision has been arrived at.

Drainage—The Board have been advised by Executive Engineer, 1st Division, regarding a comprehensive drainage system, the full instalment of which is estimated to cost about Rs. 5 lakhs. However, it is understood that no immediate action is proposed in this connection.

Anti-Malarial Works—A forecast of cost amounting to Rs. 15,300, was furnished by Executive Engineer, 1st Division, for draining ditches and low lying areas and improving the surface drainage of the vicinity of the Indian Military Hospital.

The Military authorities have completed the portion of the work within the cantonment area and the municipality would be well advised to complete the portion lying within municipal limits, otherwise there will be no proper outlet for the flow coming from the cantonment area.

MIRZAPUR

Water Supply Maintenance—This Board has made no progress in regard to introducing water prevention measures. The undertaking is working over its rated capacity and the existing pipeline and reservoirs are inadequate to meet the demand. The water is untreated and the bacteriological results are generally very unsatisfactory. The Director of Public Health has been pressing for some time for the standard of purity to be improved so that potable water can be supplied to the public, but the supply is much in excess of the legitimate demand and the cost of purification and filtration plant along with the reorganization of the waterworks would be considerable. No water tax is imposed and in consequence persons having private connections are called upon to meet the cost of a standpost supply to the public. There are far too many standposts and the number should be reduced. In order to make both ends meet the Board now propose to increase the charge for ferrule ratings, which is resented by those consumers having a private connection. This Board are really in a most fortunate position, their waterworks were presented to them by Government free of cost and by the imposition of a water tax ample funds would be available for the reorganization and the installation of purification and filtration plant now so necessary. The venturi meter which is now registering shows that the daily consumption is in the region of 1,260,000 gallons per day. The pipeline between the impounding reservoir at Tanda and the service reservoir at Lanka which has only a capacity of about 50,000 gallons per hour cannot therefore meet the maximum demand. During the year under review numerous cracks developed in the floor of the Lanka service reservoir resulting in considerable leakage. The repairs recommended by the department have been carried out by the Board's staff. During the time the repairs were in hand the supply to the town was maintained by bringing into use the bye pass and feeding direct from the Tanda impounding reservoir.

Water Supply (Rs.2,100)—A contract for sinking a trial tube well has been placed with Messrs. Reliable Water Supply Service of India, Lahore. Due to delay on the part of the Notified Area Committee in acquiring the site, the order to start work could not be given until January of this year. The 10 inch boring has been carried down to a depth 85 feet below ground level and the tube well is expected to be completed in May, 1937.

MOGHAL SARAI.

The waterworks have been taken over under licence by a limited company under the managing agency of Messrs. Noorulla Ghazanfarulla of Allahabad and a considerable sum has already been expended on developments. It is expected that an ample supply will be available shortly in all the main streets of the town.

MORADABAD.

Water Supply Maintenance—This board have made no radical changes in their water supply undertaking during the year. Progress in regard to introducing waste prevention measures is somewhat slow and unless more drastic steps are taken in cases of excessive consumption, there appears to be no possibility either of extending the hours of supply or of increasing the pressure. The Waterworks and Mechanical Engineer has indicated the necessity of proceeding with badly needed extensions and the municipal board have asked the department to prepare a scheme for the capital works needed, but due to shortage of staff this has not yet been taken up. The mechanical plant has been maintained in satisfactory order and this board are willing to take a loan to carry out the recommendations of the department.

MUTTRA.

Drainage—Several estimates have been supplied to the board for improving the drainage in certain localities, but due to paucity of funds no further action has been taken.

Sewage Pumping Station and Farm—The sewage pumping station and farm were completed by this department in 1929 and after three years' maintenance handed over to the municipal board in 1932. The works continue to function satisfactorily, the sewage farm being a source of revenue but it is understood some arrears of rent are outstanding. The board's method of operating the pumping plant is not altogether satisfactory. The sewage is allowed to back up in the outfall sewer; this causes silting and the escape through the overflow of raw sewage into the river. It appears that the plant is worked to suit the convenience of the cultivators who have leased plots at the sewage farm and not with the object it was primarily designed for. More lagoons should be provided at the farm to be brought into use when the sewage is not required by the cultivators. The outfall sewer should be considered as a gravitation sewer and the sewage disposed of immediately it reaches the pumping station instead of being allowed to stagnate.

Water Supply Maintenance—Good progress has been made with the reorganization of the distribution system and the results achieved so far have been very gratifying. The shortage of water experienced in certain localities during previous years is now becoming a thing of the past. Additional springs in the vicinity of the various pumping stations have been intercepted and the supply is now ample. Consumption has also been considerably reduced resulting in a considerable saving of electric current. Lt.-Col. W. Bell, the Electrical Engineer and his assistant Mr. Janki Nath are to be congratulated on the results obtained. Waste is now being successfully tackled and checked and other recommendations made by the Waterworks and Mechanical Engineer are receiving attention. The mechanical plant has been maintained in good running order.

MUSSOORIE.

Hydro-Electric Supply—This undertaking is in process of being reorganized; now Pelton wheels have already been installed on the existing turbine and these are working satisfactorily and many other improvements and extensions such as the renewal of the sub-station equipment are in hand. An order for the supply and erection of a 4th Diesel set has also been placed.

During the year under review, a serious hillside slip occurred above the Galogi Power House. This had been anticipated by Lt.-Col. W. Bell, the Electrical Engineer, who had warned the board that it was extremely likely that a catastrophe of this nature would occur in the near future. The slip occurred after heavy rains and diverted the stream towards the Power House which had to be shut down for some time. Prior to this accident the Board had after much discussion and dissension agreed to the purchase of the 4th Diesel engine for the Dehra Dun Power House. The wisdom of this step has now been amply justified as in the event of any further catastrophe and the shutdown of the hydro-electric plant it will now be possible for the full load to be taken by the standby plant at Dehra Dun.

A project amounting to Rs.9,11,000 for the reorganization of the electric supply undertaking prepared by the board's engineering staff was sanctioned during the year and loans to the extent of Rs.7,32,974 have been made available by Government.

Drainage—The existing drainage system is not being used to the best advantage and more pressure should be brought to bear on house owners to connect to the sewers, where they are available.

MUZAFFARNAGAR.

Drainage—A fair project amounting to Rs.70,200 for improving the drainage of Muzaffarnagar was completed and forwarded to the municipal board for their acceptance and to arrange for the requisite funds.

NAINI TAL

Water Supply Maintenance—There is a shortage of water in some areas and the board have been advised to supplement the supply by tapping new sources. Detailed advice has been given by the Waterworks and Mechanical Engineer but the board have not taken any action so far on the ground of financial stringency. The waterworks accounts are maintained in such a way that they do not disclose the true financial position. The board's Mechanical Engineer has endeavoured to follow the recommendation of this department in regard to waste prevention, and in spite of some difficulties he has had to encounter, the results obtained so far have been encouraging.

The water supplied although potable is not very palatable and there are many complaints of its excessive hardness. This can only be overcome by the installation of a modern water softening plant, the maintenance of which will be an expensive item. The board are not prepared to embark on a scheme of this nature, so the only other alternative is to tap new sources of supply from springs in the vicinity not having the same characteristics as the lake water. The mechanical plant has been maintained in good order both at the pumping station and the power house.

Hydro-Electric Supply—The position reported last year as regards the too rapid depletion of the lake during the summer months improved during the year under review owing to the early break of the monsoon and plentiful rains. However, the draw-off from the lake has just about reached the danger limit and if the demand for electric current continues, other sources of power will have to be harnessed. A project for utilizing the springs below the lake for power purposes was prepared during the year by the board's Assistant Mechanical Engineer and examined by the department. The scheme was incomplete and certain improvements and modifications were suggested and communicated to the board.

A proposal for the electrification of Kumnani which would embrace Haldwani, Kathgodam, Bhowali, Ranikhet and Almora with Naini Tal as a nucleus drawn up by the Mechanical Engineer was considered by a committee presided over by Sir Joseph Clay but it was decided for the time being not to proceed further in the matter. The board are anxious to give a supply of electricity to the Bhowali Sanatorium but until the future of Naini Tal is decided, that is, if it will continue to remain the summer capital this extension should not be proceeded with for the reasons stated.

NAJIBABAD.

The survey of the town has been completed and a set of plans supplied to the municipal board. The preparation of the fair project will be taken in hand when the necessary fees have been deposited.

ORAI. (Jalaun District)

Water Supply (Rs. 13,017)—The trial tube well which was completed last year on test gave a discharge of 236 gallons per minute with a depression head of 25 feet. The bacteriological analysis of water, however, proved unsatisfactory and the samples taken from the well by means of hand pumps both during and after the rains were also found to be unsatisfactory. If there is no improvement after the installation of pumping plant and continuous working chlorination will have to be resorted to.

RIKHIKESH.

Drainage—The survey work has been completed and a set of plans will shortly be furnished to the notified area committee and the preparation of a detailed project will be taken in hand on payment of fees.

SAHSON. (District Etawah).

Tube Well at Police Station Sahson (Rs. 2,619)—The existing Kutcha well affords practically no yield during the summer months. It is therefore proposed to deepen it, line the bottom portion with masonry and install a tube well. The work has been given to a local contractor and arrangements to start the work are in hand.

UNAO.

Water Supply Maintenance—Srenuous efforts have been made by this board to maintain a 24 hours supply, and the success achieved so far has mainly been due to the fact that all private connexions have been metered.

The accounts of this undertaking show a deficit and this is due to the free allowance being fixed too high. It is necessary that the rates should be revised so that the deficit can be wiped out. The advice of the Waterworks and Mechanical Engineer has been followed regarding alterations to the pumping machinery and some economy has been effected. This board deserve credit for the efficient manner in which they manage the undertaking.

Water Supply Extension (Rs. 21,500)—A forecast of cost providing for the extension of distribution mains to Stevensonganj and the Parao mohallas as well in

the Civil Lines has been prepared. The erection of a pressed steel balancing tank of 10,000 gallons capacity for the Civil Lines has also been included.

In addition to the works commented on the following have also been undertaken during the year under review. MISCELLANEOUS WORKS.

1. The revision of the forecast of cost for Anupshahar drainage, Rs. 25,000.
2. Preparation of a forecast of cost for Etah drainage and sewage farm, Rs. 69,000.
3. Preparation of a forecast of cost for Mainpuri drainage, Rs. 87,100.
4. Advice has also been given to practically all the municipalities and to many Government departments.

The post of Superintending Engineer was held by Mr. G. McC. Hoey up to the 14th of May, 1936, when he proceeded on twenty-eight months' leave preparatory to retirement, the charge being taken over by Mr. F. D. Tunncliffe, M.C., who continued in the office for the rest of the year. STAFF.

The post of Personal Assistant was held throughout the year by Mr. K. Chattopadaya. This officer also acted as Secretary, Board of Public Health, with effect from the 14th of April, 1936.

Mr. C. W. Casso' held the post of the Waterworks and Mechanical Engineer throughout the year.

Mr. Narbadeshwar Dayal, Mechanical Overseer, officiated as Assistant to the Mechanical Engineer in addition to his own duties until the 29th October, 1936, when Mr. N. R. Gupta, Assistant Engineer, who had been granted study leave in October 1935 returned from the United Kingdom and resumed charge.

Mr. H. G. Trivedi continued as Executive Engineer, 1st Division, Meerut, throughout the year.

Mr. F. D. Tunncliffe, M.C., held the office of Executive Engineer, 2nd Division, Allahabad, up to 12th May, 1936, when he handed over charge to Mr. S. G. Naravane, who continued to officiate for the remainder of the year.

Mr. N. D. Choudhury continued as Executive Engineer, Well Boring Operations Division, Cawnpore, throughout the year.

In addition to the above two permanent assistant engineers, 6 temporary assistant engineers including one temporary assistant engineer sanctioned for the Allahabad District Public Works Department work, 9 overseers, 12 temporary subordinates and the requisite number of computers, draftsmen and clerks were employed.

The staff of the department rendered assistance to Thomason Civil Engineering College, Roorkee, the Lucknow University and the Registrar, Departmental Examinations, Allahabad, as examiners and lecturers in engineering subjects.

The department is seriously understaffed and arrears of work are steadily accumulating and important schemes are being delayed.

The staff, with few exceptions, have striven hard to meet the demands made on them and many members have had to forego leave and work overtime to keep abreast with the work.

F. D. TUNNICLIFFE,

M.C., ASSOC. M. INST. C.E.,

*Superintending Engineer, Public Health
Department, United Provinces.*

LUCKNOW :

The 29th July, 1937.

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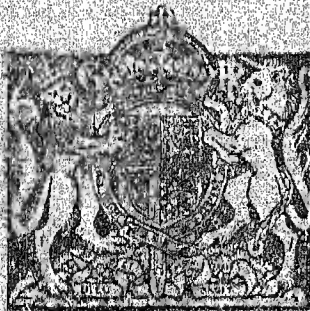
FORTY-FIRST ANNUAL REPORT

OF THE

SUPERINTENDING ENGINEER

PUBLIC HEALTH ENGINEERING DEPARTMENT
UNITED PROVINCES

FOR THE YEAR ENDED MARCH 31, 1936



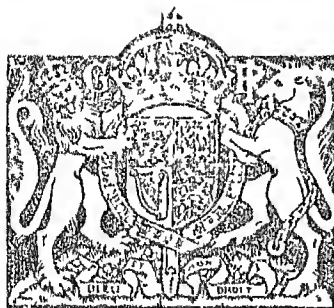
ALLAHABAD.

SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES

1936

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FOR THE YEAR ENDED MARCH 31, 1936



ALLAHABAD:
SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES
1936

Forty-first Annual Report of the Superintending Engineer, Public Health Engineering Department, United Provinces for the year ended 31st March, 1936

THE extent of the duties undertaken by this Department in the year may be gauged from the following table :

Item no.	Nature of work	Amount involved in lakhs of rupees	Remarks																								
1	Duties under the Local Authorities Loans Act, 1914, and the Municipalities Act, 1916, i.e. the supervision and inspection of all open waterworks and drainage pumping stations.	71.70	This amount represents the turnover in revenue and expenditure on water supply, drainage and electricity supply and is made up as follows : <table> <tr> <th></th><th>Revenue</th><th>Expenditure</th><th>Total</th></tr> <tr> <th></th><th>Rs.</th><th>Rs.</th><th>Rs.</th></tr> <tr> <td>Water-works.</td><td>80,06,151</td><td>26,81,671</td><td>56,87,822</td></tr> <tr> <td>Drainage.</td><td>61,980</td><td>1,25,576</td><td>1,87,556</td></tr> <tr> <td>Electric supply.</td><td>7,13,722</td><td>5,81,013</td><td>12,94,734</td></tr> <tr> <td>Total..</td><td>87,81,853</td><td>33,88,259</td><td>71,70,112</td></tr> </table>		Revenue	Expenditure	Total		Rs.	Rs.	Rs.	Water-works.	80,06,151	26,81,671	56,87,822	Drainage.	61,980	1,25,576	1,87,556	Electric supply.	7,13,722	5,81,013	12,94,734	Total..	87,81,853	33,88,259	71,70,112
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2	Local works— (a) Preparation of projects (b) Construction	30.51 2.15	27 detailed proposals. Payments made.																								
3	Provincial works— (I) Miscellaneous (a) Preparation of projects (b) Construction (c) Maintenance (II) Allahabad district works (a) Preparation of projects (b) Construction (c) Maintenance (III) Central works (a) Construction (b) Maintenance	2.22 0.82 0.08 7.69 0.71 1.65 0.01	15 detailed proposals. Payments made. Lucknow G. H. Canal and Gumti Weir maintenance works. 71 detailed proposals. Payments made.																								
4	(a) Advice free to local authorities (b) Advice free to Government Departments.	9.91 0.18	23 forecasts of cost with reports supplied free. 8 forecasts of cost with reports supplied free.																								
5	Board of Public Health business : (a) Examination of projects for urban works. (b) Examination of projects for rural sanitation. (c) Checking progress on urban and rural areas works, G. O. nos. 469/XI, dated the 6th February 1931, 470/XI, dated the 6th February 1931, 580/XI, dated the 11th February and 490/XI, dated the 9th April 1931.	29.75 2.81 8.68	36 projects and 16 forecasts of cost were scrutinized. 601 projects were scrutinized. Progress reports collected and consolidated for the Accountant General, United Provinces.																								
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7	Inspection and reports on works carried out by local bodies.	0.49	Mussoorie works.																								
8	Scrutiny of certain municipal budgets. G. O. no. 4713/XI—19-H, dated the 19th January 1933.	412.25	Under head of revenue and expenditure, water supply, electric supply, drainage, conservancy and sewage disposal, public works, public lighting, budgets comprising original and revised schedules and budget of municipalities and notified areas were scrutinized.																								

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2. The expenditure on works carried out by this Department during the year totalled Rs.5.42 lakhs. The total value of works for which projects, including preliminary proposals and forecasts of cost, were framed amounted to Rs.50.51 lakhs in the year.

Fees.

3. A total amount of Rs.16,705 was earned in fees for works carried out for local authorities. These fees were levied according to government orders on item 2 only of the table above. The fees earned on construction amounted to Rs.37,218, whilst the fees earned on preparation of projects amounted to Rs.9,487, making up the total above referred to.

In addition to the above fees, a sum of Rs.1,963 was recovered for hire of tools and plant from contractors. A further sum of Rs.1,317 was realized as supervision charges on the value of works carried out in the workshops of the Well Boring Operations Division.

Budgets of Local
authorities.

4. The administration reports of municipalities and notified areas received in this office show that a total expenditure of Rs.1.12 crores took place during the year, of which sum Rs.87.02 lakhs was for expenditure on public works. The larger municipalities who provide piped water supply spent Rs.93.42 lakhs on these supplies and the same municipalities also during the year spent a sum of Rs.79.64 on drainage, in both cases on works of a capital nature.

The total establishment charges of this department, namely Rs.285,614 for the year under review, amount to only 1.09 per cent. of the amount which local authorities spent on public works over which this Department is required to exercise the supervision prescribed by the rules.

Quinquennial es-
tablishment returns.

In the administration report of this Department for the year ended 31st March, 1932, Appendix XVI, a statement was given showing the establishment percentages for the quinquennium 1925-26 to 1929-30. The figures for the quinquennium 1930-31 to 1934-35 have now been collected and analyzed and are attached to this report, Appendix "T". The cost of the Department has fallen from Rs.17.3 lakhs to 14.9 lakhs in the quinquennium, and large reductions have taken place in the value of works constructed, e.g. Rs.97.7 lakhs were spent by the Department on works during the first quinquennium whilst only Rs.31.0 lakhs were spent during the second. The contingent establishment charges for the preparation of projects have shown signs of reduction whilst the contingent charges for construction have risen. This rise is traceable to the small amount spent on dispersed works, which require almost as much time, travelling expenses and supervision as the large works. The tendency appears to be for local authorities to carry out more of their own works while relying on this departmental staff for technical advice only.

Loss of public
money.

The reports of inspecting officers, particularly those of the Mechanical Engineer for Waterworks, emphasizing the losses which take place in the water-supply undertakings, are at last having a noticeable effect. There are few boards who possess waterworks and who have not now become alive to the seriousness of their losses. Some have taken creditable action and all are now engaged in discussing ways and means of meeting the situation disclosed in the reports. Where the boards have followed the advice and adopted a twenty-four hours' supply, a marked reduction in the consumption has been reported and several boards have been courageous enough to institute steps against consumers who persist in waste.

The method of carrying out works is still open to objection in the majority of boards in that G. O. no. 1015/XI—91, dated the 5th April, 1930, is not properly complied with and the letting of works on contract is not carried out in a sufficiently public and businesslike manner.

Developments.

The number of public water supplies, which had doubled since 1920, has increased by the addition of one more water-works. The number of sewage pumping stations and municipal hydro-electric undertakings remained the same as last year. The capital invested in water supplies in the United Provinces now amounts to rupees 3.16 crores.

Shortage of staff has not permitted any appreciable progress in the clearing of arrears and in many instances requests for assistance have had to be refused.

Following the example of Moradabad in the previous year, Aligarh Municipal Board, also has this year handed over its water supply service to licensees, as permitted by the amendment to the Municipal Act (28th October, 1930).

Much greater circumspection has been noticed on the part of all local authorities in appointing staff and in filling posts, and this is traceable to the surcharge rule and audit inspections. More intensive audit would result in still better results.

The elections which took place this year caused some slackening in efforts and delays though the personnel of most boards did not undergo much change.

GENERAL REMARKS

A noticeable improvement in the management has taken place during the year in general. This improvement can be traced to the numerous criticisms made concerning the management of the supplies, and it is evident that the Municipal Commissioners now themselves have commenced to realize the magnitude of the losses which are being suffered by faulty maintenance.

G. O.s no. 3824/XI—396, dated the 23rd November, 1934, and no. 3978/XI—396, dated the 2nd January, 1935, which require a quarterly survey of the water wasted to be made, have not been observed by all the Boards concerned. But in the towns where the orders have been complied with, an appreciable reduction in waste has resulted. These Government orders emphasize the importance of waste prevention and prescribe monthly night tests. Steps to deal with the waste have been effectively taken in more than one municipality with surprising results, and much less has been heard recently concerning the inadequacy of the pumping and filtration plant than formerly when no attention whatever was paid to waste. Eight towns now afford a continuous supply to the public, and in the cases of Haridwar, Unao and Hathras a marked diminution in the demand has resulted.

Waterworks continue to be very profitable undertakings for most of the local authorities and a total profit of 3.24 lakhs of rupees accrued in the year and has been absorbed in the general revenues of the boards. Should the plant at any station ever be found to be inadequate, there is no doubt but that the waterworks itself could easily be made to bear the loan charges necessary for increasing its capacity.

There is a deep-seated aversion on the part of the average consumer to being put on a metered supply, and this attitude is not astonishing when the manner in which a board maintains its meters is examined. Few meters are ever removed for adjustment and testing, but almost all are allowed to remain in position for years whilst the consumer is often at the mercy of the meter inspector.

The night tests which were inaugurated this year have brought prominently to the notice of the boards the quantity of water which is wasted and which cannot be accounted for. The result of these night tests as reported by the various authorities is tabulated in Appendix "U".

The quality of the water supplied has fallen off considerably, especially in those towns where an intermittent supply is afforded. Though every possible effort to supply pure water may be made at the pumping station, yet such efforts are negatived when contamination takes place through leaky fittings during the hours when pressure is not maintained.

Drainage—Intermittent water supplies militate against any marked increase in the use of sanitary fittings and local authorities generally are averse to bringing into operation by-laws insisting on property owners connecting up their property in such a manner as to prevent foul water discharges finding way into the public thoroughfares and thence into the adjacent storm water channel. In Cawnpore and Lucknow there has been an appreciable extension of house drainage and the use of sanitary fittings but not nearly so much as there would have been had a proper water supply been assured.

The drainage pumping stations are generally not operated to the best advantage, the usual method is to allow sewage to pond up from many miles in the main sewers before the pumps are brought into operation. This practice results in the sewers becoming silted up and causes great expense in clearing operations. The protection of road surfaces in town areas with tar compositions has improved the surface drainage and such work has become popular owing to its dust abating power.

OPERATION OF LOCAL AUTHORITIES

Water-supply—A sum of Rs.45,538 was provided by the board to enable the Executive Engineer, I Division, Public Health Department, to undertake the work of coaching the municipal staff in waste prevention measures and in applying meters. About 12,000 private connexions were inspected, of which over 1,400 were found defective. In addition to this about 750 public standposts had to be repaired and during 18 night tests about 620 private connexions were found wasting water in a lavish manner. The Superintending Engineer agreed to undertake the waste prevention work on condition that the board applied the water supply rules vigorously, but it would appear that the board has not been able to abide by its bargain and the waste prevention measures have therefore been suspended, though at one time they showed great promise. In these circumstances it was thought better to allow the board to solve the problem of waste according to its own devices and the divisional staff has therefore been removed.

The steps which the board has been urged to adopt are as follows :

Some permanent organization for the detection and prevention of waste, which it is estimated should consist of two head inspectors at Rs.150 each per month and night and day staff consisting of four inspectors each on pay of Rs.50—100 per mensem. In addition it is estimated that between five and six hundred meters will

Waterworks.

AGRA

AGRA—(concluded).

be required to deal with the non domestic supplies under the rules, together with spare parts for repairs as well as meter testing appliances, for which two skilled mustris at Rs.100 each per mensem will be required.

The whole distribution system should be thoroughly investigated and all unauthorized connexions removed from the rising mains and the supply mains, and connected to the district mains, and additional storage tanks should be provided in such areas as Shahganj and Billochpura.

The supply hours should be increased gradually as the waste prevention measures become more and more effective until a continuous supply is maintained. The Worthington engines and the old diesel sets at the pumping station have reached a stage of their life when their replacement by modern units will be economical.

The methods of settlement and purification at present in vogue admit of improvement, for which a project should be prepared.

The Mechanical Engineer in his reports has dealt with all the above items and many additional ones to which the attention of the board has been invited. Among the additional items the more important are the provision of bulk meters and recording apparatus on the clear water pumping rising main, proper gund washers, reconditioning of the rapid sand filters, and the protection of the waterworks compound from trespassers and contamination. The complete overhaul of the fire fighting appliances is also another important item which the board should attend to.

The mental hospital in the Billochpura area suffers considerably from water shortage. It was hoped that the success of the waste prevention measures would have enabled a proper supply to be given but since this object seems to be unattainable, certain proposals were made for providing electro-motor pumps with a service reservoir at Billochpura to alleviate the distress in this area. These pumps would draw water from the low zone where the pressure is high and the supply continuous. These steps are likely to remain successful so long as the rising main to Billochpura remains untapped.

The dry weather shortage in the Jumna which jeopardises the raw water supply at the waterworks in the dry season has been given special attention by the Irrigation Department recently in view of the permission which has been given to the Radhaswami Institute to pump several canals of water from the Jumna stream.

The inspection of the meter register showed that few meters were being read and that the board was suffering considerable loss owing to the delinquencies of its staff.

Drainage.—It is generally recognised that a proper drainage system is a most desirable work at Agra to prevent pollution of the Jumna and the nuisance of the sand bank opposite the Fort, but so far no headway has been made with this scheme.

ALIGARH.

Aligarh Water-supply.—The Aligarh water-supply, for which a licence was granted to Messrs. Noorullah Ghaznafarullah by the Municipal Board with the concurrence of Government, has been taken over by the firm. The plant has been brought into proper working order, meters have been applied practically everywhere, and extensions of the supply to the University and Civil Lines are already being considered by the firm, which has already constructed a new well to supplement the supply.

ALLAHABAD.

Allahabad water-supply.—The board has been advised to proceed with waste prevention measures, for which two Head Inspectors at Rs.150 per mensem each are required together with four night and day inspectors on a pay of Rs.50-100 per mensem each to carry out systematic house-to-house inspections and reduce the present enormous amount of waste to within reasonable dimensions. Waterworks fittings such as public standposts and hydrants are in a bad state of repair. Steps should be taken to repair those wherever possible or to replace them with fittings of a reliable make.

The hours of supply should be increased as the waste prevention measures become more and more effective until the public are afforded a twenty-four hours' supply.

The distribution mains in many places are too small to admit of the legitimate demands. The distribution system should therefore be examined and a project prepared for its reorganization, with special reference to the Baraganj supply.

About 500 meters will be required to control the non-domestic supplies as well as those consumers who persist in wasting water; and the necessary repair tools, spare parts and staff to carry out the repairs should be provided. Even when waste is reduced to within normal limits it will probably be found necessary to instal a

further pumping set at the Khusrubagh Pumping Station ; funds should be provided ALAHABAD—(contd.) for this work.

The rising main from Karelalbagh might with advantage be duplicated as this will enable a considerably greater output from the Karelalbagh raw water pumps.

The methods of settling and filtration at the Karelalbagh Station admit of much improvement, and a project for this should be prepared and funds found.

The board has taken steps to bring into operation the tube-well in the Civil Lines which will enable the outlying areas to be afforded a proper supply. In the reorganization of the distribution system steps should be taken so that the high area served by the wells may be isolated from the lowlying areas.

The board should overhaul its fire fighting appliances and make allowance for a certain quantity of emergency chemical fire-extinguishing apparatus.

The Mechanical Engineer in his report both on the water supply and drainage pumping stations has made many detailed recommendations which are worth careful study.

The tube-well on the Thornhill Road was commenced in July, 1933, and completed in January, 1935. A yield of 415 gallons per minute with a depression of 23 feet was obtained. The 1934 earthquake evidently disturbed the strata in Allahabad, for, the auxiliary piping inserted for the purpose of this strainerless well became so fast in the bore that they could not be removed with any available appliance. A length of over 1,160 feet of auxiliary piping has had to be abandoned in this way in the bore hole. The Katra tube-well was started in December, 1934, and completed in October, 1935. A yield of 324 gallons per minute with a depression of 20 feet was proved on test. Both wells have now been handed over to the Municipal Board, which has deposited funds with this Department and requested that the necessary pumping plant be installed to make full use of the supply.

A forecast of cost and advice was furnished this board for additional electro-motor driven pumping sets at the Khusrubagh station. The cost of the work is estimated to amount to over Rs.20,000.

Allahabad Drainage—The re-organization of the drainage pumping station is a pressing matter, as the pumps at present cannot cope with the sewage flow. The methods of pumping are defective whereby the sewage is allowed to collect in the sewers to a depth of many feet before the pumps are operated. This results in the bulk of the sewage overflowing and finding its way into the storm channels and defiling the Jumna ghats. At the same time the sewers themselves are slowly becoming silted up.

The second rising main across the Jumna bridge has been removed. This main should be replaced at the earliest possible date, if it cannot be relaid across the bridge, then it should be relaid in the bed of the river with steel piping and anchors.

Adh-kumbh Mela Water-Supply—The standby tube-well, which was not used since the Kumbh Mela in 1929-30, was tested by means of a temporary plant and a discharge of 290 gallons per minute with a depression of about seventeen feet was proved. The mela pumping station plant was overhauled and put in thorough repair and in addition to this a temporary steam plant was provided as an auxiliary to ensure that an adequate supply of water was available during the mela.

A water supply was satisfactorily maintained throughout the period of the fair, the capacity of the elevated tank at the second tube-well was doubled and twenty new 2½" fire hydrants were fixed on the distribution. Three fires which broke out during the mela were brought under control within a short time.

Owing to the intensity of the pilgrim traffic and the nature of the dry weather bed of the Ganges, an additional pontoon bridge had to be constructed at a cost of over Rs.11,000. This work was successfully put in hand and completed, though delay in obtaining the pontoons from Mirzapur was encountered.

Adh-kumbh Mela Electric Supply—Some delay occurred in the completion of this work owing to failure on the part of the contractors ; steps have been taken to prevent a recurrence. In order to prevent the Ganges stream from eroding the mela ground in the vicinity of the Sangam, certain river training works were taken in hand. Sal bulli spurs were used for this purpose and the work proved completely successful.

Assistance was given the municipal board in preparing proposals for an infectious diseases hospital.

Buildings and Roads Work, Allahabad District—The third year of the demonstration of the working of the contract system has now been successfully completed, and the period has been extended for two years under Government orders and fresh contracts have been prepared and tenders invited. The whole of the

ALLAHABAD—(contd.). district roads and the annual repair and maintenance to public buildings and the maintenance of the pontoon bridge at Jhusi have all been let on contract as well as the maintenance of the electrical installations in all Government buildings. Only petty works such as the maintenance of the Alfred Park pumping station, Kasulabad distillery plant, the Ben and Buxin Bunds and arboriculture operations were carried out departmentally.

Miles 1 and 2 of the Link Road in Allahabad have been reconstructed in cement concrete. Tenders were invited in September, 1935, and the work is now completed at a cost of about one lakh of rupees.

Allahabad Rewa Road—The reconstruction of this road is estimated to cost over 3.88 lakhs of rupees. It is proposed to construct 2½ miles in concrete and 25 miles with a treated surface of stone metal. Tender forms have been prepared for the latter part and tenders have been invited and the comparative statements with the recommendations are receiving the attention of Government.

Miles 498-500 of the Grand Trunk Road will shortly be relaid in cement concrete and a project for this work is under preparation.

Naini Central Jail water-supply—Estimates were prepared at the instance of the Superintendent and certain advice given regarding the water supply to this Jail.

The municipal authorities were provided with an estimate for a temporary supply to the George Town area which suffers from acute shortage in water supply.

ALMORA.

Water-supply maintenance—The shortage complained about is due to the great diminution in the forest springs which takes place during the dry weather, when the supply falls to about four gallons per head of the resident population though during most of the year the supply is adequate, amounting to over 15 gallons per head per day. Almora shows signs of rapid growth and the water shortage is likely to become more acute in the near future. The Mechanical Engineer in his recent inspection made several recommendations concerning the conservation of the springs and increase in the supply, which the board would do well to consider and take effective steps upon. In the event of the Kumaon hydro-electric supply materializing the provision of extra water for Almora would be greatly facilitated.

AHRAURA (MIRZA-PUR DISTRICT).

Ahaurura water-supply—This town, which has a population of 8,916 and which is situated in the Mirzapur District, was inspected and a forecast of cost for a public water-supply was prepared and furnished the local authority. The estimate of the work amounted to about Rs.25,000.

AJODHYA (DISTRICT FYZABAD).

Ajodhya water-supply—The second tube-well was completed in June, 1935, and on testing afforded 286 gallons per minute with a depression of 35 feet in the spring water level. The first tube-well which was completed in 1931, afforded 325 gallons per minute with a drop of 17 feet but this well was of the strainerless type. There is sufficient scope now for inaugurating a public water supply to Ajodhya and to the mohas held there as soon as the board can find the necessary capital.

BAHRAICH.

Bahraich water-supply—A modified instalment of the water supply project estimated to cost Rs.1.51 lakhs was prepared for the board, which is at present considering.

Dargah Syed Salar Fair water-supply—The committee is still considering the proposals for water supply to the fair, but so far has not arrived at any conclusion even as regards the construction of a trial tube-well.

Bahraich drainage—A project amounting to about one lakh of rupees has been furnished the municipality for drainage improvements, which provides for new sewers, kerb and channel drains, brick pavements and road metalling.

BENARES.

Benares water-supply—The general advice which the Mechanical Engineer gives in his periodical inspections has been followed in this waterworks and as far as its pumping stations are concerned it is to be congratulated on their condition.

The waste prevention measures which have been undertaken in the face of fierce opposition have resulted in much benefit, the hours of supply have been increased and the pressure all over the town has been markedly improved. The waste figures are still high and much more work remains to be done. Certain advice has been tendered concerning the improvement of the methods of settlement, filtration and sterilization, for which funds will have to be found. The water works superintendent is preparing a project for isolating certain high areas in the distribution so that the consumers there may be assured of proper pressure.

Benares drainage—The fouling of the ghats by crude sewage has been a burning question for many years past, and a forecast of cost was furnished the board for a number of small sewage and pumping stations designed to intercept the sewage and pump it into the main drainage system of the town. Further investigations show that much of this sewage is overflowing from the drainage system owing to the choking up of the sewers from heavy deposit. Investigations have been carried out

and much work has been done in tracing out the points where the material is either dumped or finds its way into the sewers and considerable expenditure has been incurred in removing deposits from the sewers.

Special arrangements have been made to flush the main sewer with raw water from the Bhadani pumping station and proposals for extending the system to those mohallas on the river bank which at present have no foul water drainage facilities are under consideration.

The question of disposing of the sewage which at present is allowed to outfall below the railway bridge is being considered, and proposals for pumping and farming it are being drawn out. This municipality has recorded much satisfactory progress both as regards waste prevention and drainage improvements during the past year.

Udaipur College Drainage—Advice was given the college authorities concerning the drainage of the college compound, and an estimate amounting to over Rs 85,000 furnished for the work.

Bijnor Drainage—At the request of the board preliminary proposals for the drainage of Bijnor Town were prepared, and these are under consideration by the board. The first instalment is estimated to cost about Rs.79,000.

Bindhachal Water Supply—Several surface wells in the town were tested, but their yield was so insignificant that they could not be used for an adequate water supply to the town. The well constructed on the Ganges bank by the board itself did not prove deep enough, so that no proper test could be made of its yield. The board was advised to attempt a rock boring of no great depth, but so far has reached no conclusion on this proposal.

Brindaban Water Supply—Investigations carried out over a considerable number of years failed to locate any sweet water in the vicinity of the municipal area. A grant was given by the Board of Public Health amounting to Rs 13,700 for testing the wells constructed in a stable sand bank on the right bank of the Jumna. Unexpected success was attained and the well which was completed in October, yielded 152 gallons per minute with a depression of 7 feet. Two further wells are being constructed to afford a source from which a reliable water supply may be furnished to the town. As the site of these wells is subject to occasional inundations of the Jumna, specially designed arrangements will be necessary.

Drainage extensions of this town aggregating Rs.65,000 have been satisfactorily completed and handed over to the municipal board.

Some assistance was rendered at the District Jail with the object of improving the water-supply.

Water-supply—The burning question in connexion with this water supply is the acute shortage which takes place; this is due to waste primarily, but also to the great extensions which have taken place in the development of the town. The Mechanical Engineer visited Cawnpore and provided the board with a detailed report and recommendations on measures to deal with the defects, and the board has requested that a complete reorganization scheme be drawn out by this Department. This unfortunately is not possible owing to shortage of staff and pressure of other works.

The main works to be put in hand are in the order of their urgency: waste prevention, extension of the source of supply either from the canal or both from canal and the river, increased settlement and filtration facilities, reorganization of the distribution, provision of mains, venturi meters, the provision of service reservoirs in outlying areas, and a large number of details which have been dealt with fully in the Mechanical Engineer's report.

Drainage—The nuisance taking place in the Sisaman area owing to the heading up of sewage caused by the inadequacy of the pumping plant at the Parmatghat Station became so acute that this department was requested to prepare a special report on the case. In pursuance of the recommendations of this report the municipal board authorized the calling of tenders for sewage pumping plant and rising mains to replace the existing arrangements, which are totally inadequate to deal even with the dry weather flow. Tenders were invited and recommendations made to the municipal board as regards the letting of the contract.

The fair project was for the drainage and improvements to the old Cawnpore area completed and presented to the municipal board. The work necessary will cost Rs.2.26 lakhs.

The Executive Engineer rendered advice to the municipal authorities concerning the problem of relieving the Cooperganj area of storm water flooding.

The sewage at Cawnpore at present discharges into the Ganges and periodic complaints are received concerning the fouling of the river. The board has still under consideration methods for treating this sewage.

Advice was given the local authority concerning a water-supply to the hospital.

BENARES—(contd.)

BIJNOR.

BINDHACHAL
(Mirzapur District).

BRINDABAN
(Muttra District).

BU DAUN.

CAWNPORE.

CHANDAUH
(Benares District).

DEHRA DUN.

Dehra Dun water supply—Some difficulty has been experienced in getting proper night tests carried out at Dehra Dun. The Board do not consider that much water is being wasted either by the consumers or by leaky mains. The shortage has become more acute than ever and the Bandal Nadi supply is being expedited on account of this shortage.

The supply from the Kolukhet springs has now been regulated so that the Rajpur area does not draw off more than its just share, and this arrangement has resulted in the higher portions of Dehra Dun receiving a better supply.

Steps are being taken to protect the Kolukhet springs, concerning which unsatisfactory reports are frequently received. It is imperative that the chlorinating plant at the springs be kept in continuous operation. It is possible that the Nalapani supply could be augmented appreciably on the lines enumerated by the Mechanical Engineer in his inspection notes.

Tenders were called for the extension of the water supply from the Bandal Nadi, and the board has taken a loan of Rs.5.61 Lakhs to prosecute the work. Messrs. Thakur Kundan Singh of Dehra Dun were awarded the contract for the pipeline and building work and Messrs. Candy Filters (India), Limited, have been awarded the contract for the filtration plant.

Dehra Dun is a rapidly growing town and the board is already taking steps to reorganize the distribution system so that the public may everywhere be benefited by the extra supply from the Bandal Nadi.

An agreement with the Irrigation Department for abstracting one cusec from the Bandal Nadi and for the necessary regulating and recording apparatus is under preparation.

An experimental boring which was carried down to almost 150 feet and from which no adequate supply could be obtained, was about to be abandoned when it was thought that some of the springs which were met with before reaching the 90 feet depth might be worth testing. For this purpose the bottom of the bore was plugged and slots were cut by means of special tool at the levels where the boring chart indicated the existence of spring water. Exhaustive tests proved that these springs were merely pockets of water and that they soon became exhausted with continuous pumping.

Drainage—The Board of Public Health have offered the municipal board a sum of Rs.10,000 on condition that the board provides sufficient money from its own resources to complete a useful instalment of the Lakhi Bagh drainage work. This offer is being considered by the board.

Sewage disposal—Extension of the sewage farm at a cost of over Rs.16,000 has been sanctioned and this work is being carried out by the Executive Engineer on behalf of the board.

DEORIA.
(Gorakhpur District).

Deoria Drainage—Drainage works estimated to cost almost Rs.23,000 have been completed and it is expected that the system will be handed over in proper working order in May or June, 1936 to the local authority.

DEWA.
(Barn Banki District).

Dewa fair water supply—The committee has not taken over the pumping station and plant from the Department, but negotiations have been entered into with a reliable private firm in order that the contract may be complete for a regular and adequate supply of water to the mela without the committee having itself to employ staff. In the meantime the water supply was arranged departmentally and a copious supply afforded to all who attended the mela.

ETAWAH.

Etawah water supply—Assistance was given both to the municipal authority and to the police at Sahau station as regards the improvement to water supply.

FATEHGARH.

Fatehgarh—The jail authorities were given advice concerning improvement in the jail water supply.

FATEHPUR SIKRI.

Water supply maintenance—This supply is generally in a good state of repair. A standby set is a necessity. Some complaints have been received concerning the saline nature of the water during the dry months of the year. Waste amounts to very little at Fatehpur Sikri, and there are only four private connexions. The supply has proved adequate for all purposes though it only amounts to less than 8 gallons per head per day.

FYZABAD.

Water supply maintenance—Great reluctance has been noticed on the part of the board to carry out and follow night tests and apply the rules with the object of reducing waste. The board apparently does not intend to proceed with the metering of private connexions, although they were granted a loan of Rs.10,000 for this purpose. No efforts have been made to increase the hours of supply which is itself a method of reducing the consumption. The existing wells afford insufficient water for the demand which takes place during the hot months. The Mechanical Engineer in his reports has drawn attention to many methods of improving the supply and reducing charges, but for some reason or other the board does not seem to be able to

carry out any of the recommendations though the waste approaches in extent one-third of the total quantity of water pumped

FYZABAD—(conold.)

Fyzabad water supply—The new tub-well, which was satisfactorily completed, is now being harnessed to work in conjunction with the existing pumps. The work of repairing the masonry sump, the air compressor and air lift pump and the connections to the suction of the existing pumps is being let on contract

Ghaziabad—Assistance was given to the Postmaster General in order that a proper water supply with an electric pump might be provided for the Ghaziabad post office

GHAZIABAD
(Meerut District).

Water supply—Three contracts have been let for this work, which comprises supply and erection of pumping plant, the supply and laying of water mains and construction of buildings and elevated tanks, and the supply of water meters. Tenders have been received and the board has accepted the recommendation made and the contracts have been placed

GHAZIPUR.

Gorakhpur drainage—The main outfall works were completed at a cost of about Rs 31,000 and were handed over to the board in August, 1935. The board has in view a further instalment of the drainage system, estimated to cost about Rs.47,000.

GORAKHPUR.

Water supply maintenance—The adoption of continuous settlement recommended by the Mechanical Engineer has now been acted upon and has improved the quality of the water though alum is only used during the rains when the supply is turbid. Proposals for ammonia and chlorine treatment of the supply are at present being investigated. The Notified Area does not impose any general water tax and it is therefore handicapped in finding funds for extensions and improvements. The committee has taken certain steps which have proved beneficial in the reduction of waste, but much more remains to be done. The electrification of Haldwani would render an extension of the water supply less difficult and expensive. It is understood that the committee are negotiating with the Nain Tal Board for an electric supply.

HALDWANI.

Advice and estimates were furnished this notified area, comprising the installation of bulk meters and ammonium chloride dosing apparatus and other appurtenant work, the cost of which will be about Rs.11,000.

Hamirpur—An exploratory boring was carried out in the bed of the Rohine Nala for the purpose of ascertaining the nature of the sub-soil and its adequacy for bridge foundations.

HAMIRPUR
(District Banda).

Hapur Water Supply—The municipal board were furnished with advice and an estimate concerning a water supply to its municipality. These proposals are still under consideration.

HAPUR.

Hardoi Drainage—Tenders were invited, a comparative statement was prepared and the contract let with the approval of the local authority for drainage work, which will cost over Rs.83,000.

HARDOI.

Water Supply Maintenance—The waste prevention measures which have been regularly carried out since August last and the inauguration of a continuous supply to the public have had a very beneficial result. It is estimated that 10 million gallons of water have been saved by these measures and over 5,000 units of electricity during six months' working.

HARDWAR.

Most of this improvement is due to the twenty-four hours supply, as the waste prevention measures have only been successful to a limited degree, and it is possible that some of the underground mains are leaking. In his report the Mechanical Engineer has enumerated the measures which require careful consideration for further improvement of the water supply, such as small storage tanks for standposts, the metering of all supplies which are of a non-domestic nature, the insistence on house cisterns, the proper control and adjustment of all flushing tanks.

The use of a proper semi-positive type motor instead of the cheap inferential type is also recommended, as well as the provision of meter testing equipment and staff. The staff employed is not sufficient to meet the exigencies of work and references have been made to the board on this matter.

The accounts show that profits have fallen from Rs.24,000 to Rs.12,000 per annum, and in his report the Mechanical Engineer analyses the results and recommends that the cause of this fall in revenue be investigated. The revenue per thousand gallons supplied has fallen from 11.2 annas to 9.9 annas in a period of seven years. This investigation should not be delayed as the pumping capacity of the supply has been almost doubled by the bringing into use of the 4th tube-well, and losses may be seriously increased by lack of proper measures.

Hardwar water supply—A fourth tube-well which is being constructed in the office compound of the municipal board has been successfully developed, and an electro-motor driven airlift with a centrifugal pump has been installed and is at present undergoing test. This source will practically double the available supply to Hardwar Union.

HARDWAR.

DEHRA DUN.

Dehra Dun water supply—Some difficulty has been experienced in getting proper night tests carried out at Dehra Dun. The Board do not consider that much water is being wasted either by the consumers or by leaky mains. The shortage has become more acute than ever and the Bandal Nadi supply is being expedited on account of this shortage.

The supply from the Kolukhet springs has now been regulated so that the Rajpur area does not draw off more than its just share, and this arrangement has resulted in the higher portions of Dehra Dun receiving a better supply.

Steps are being taken to protect the Kolukhet springs, concerning which unsatisfactory reports are frequently received. It is imperative that the eldormating plant at the springs be kept in continuous operation. It is possible that the Nalapani supply could be augmented appreciably on the lines enumerated by the Mechanical Engineer in his inspection notes.

Tenders were called for the extension of the water supply from the Bandal Nadi, and the board has taken a loan of Rs.5.61 Lakh to prosecute the work. Messrs. Thakur Kundan Singh of Dehra Dun were awarded the contract for the pipe line and building work and Messrs. Candy Filters (India), Limited, have been awarded the contract for the filtration plant.

Dehra Dun is a rapidly growing town and the board is already taking steps to reorganize the distribution system so that the public may everywhere be benefited by the extra supply from the Bandal Nadi.

An agreement with the Irrigation Department for abstracting one cusec from the Bandal Nadi and for the necessary regulating and recording apparatus is under preparation.

An experimental boring which was carried down to almost 150 feet and from which no adequate supply could be obtained, was about to be abandoned when it was thought that some of the springs which were met with before reaching the 90 feet depth might be worth testing. For this purpose the bottom of the bore was plugged and slots were cut by means of special tool at the levels where the boring chart indicated the existence of spring water. Exhaustive tests proved that these springs were merely pockets of water and that they soon became exhausted with continuous pumping.

Drainage—The Board of Public Health have offered the municipal board a sum of Rs.10,000 on condition that the board provides sufficient money from its own resources to complete a useful instalment of the Lakh Bagh drainage work. This offer is being considered by the board.

Sewage disposal—Extension of the sewage farm at a cost of over Rs.16,000 has been sanctioned and this work is being carried out by the Executive Engineer on behalf of the board.

DEORIA.
(Gorakhpur District).

Deoria Drainage—Drainage works estimated to cost almost Rs.23,000 have been completed and it is expected that the system will be handed over in proper working order in May or June, 1936 to the local authority.

DEWA.
(Bareilly District).

Dewa fair water supply—The committee has not taken over the pumping station and plant from the Department, but negotiations have been entered into with a reliable private firm in order that the contract may be complete for a regular and adequate supply of water to the mela without the committee having itself to employ staff. In the meantime the water supply was arranged departmentally and a copious supply afforded to all who attended the mela.

ETAWAH.

Etawah water supply—Assistance was given both to the municipal authority and to the police at Sahon station as regards the improvement to water supply.

FATEHGARH.

Fatehgarh—The jail authorities were given advice concerning improvement in the jail water supply.

FATEHPUR SIKRI.

Water supply maintenance—This supply is generally in a good state of repair. A standby set is a necessity. Some complaints have been received concerning the saline nature of the water during the dry months of the year. Waste amounts to very little at Fatehpur Sikri, and there are only four private connexions. The supply has proved adequate for all purposes though it only amounts to less than 8 gallons per head per day.

FYZABAD.

Water supply maintenance—Great reluctance has been noticed on the part of the board to carry out and follow night tests and apply the rules with the object of reducing waste. The board apparently does not intend to proceed with the metering of private connexions, although they were granted a loan of Rs.10,000 for this purpose. No efforts have been made to increase the hours of supply which is itself a method of reducing the consumption. The existing wells afford insufficient water for the demand which takes place during the hot months. The Mechanical Engineer in his reports has drawn attention to many methods of improving the supply and reducing charges, but for some reason or other the board does not seem to be able to

carry out any of the recommendations though the waste approaches in extent one-third of the total quantity of water pumped.

Fyzabad water supply—The new tub-well, which was satisfactorily completed, is now being hurried to work in conjunction with the existing pumps. The work of repairing the masonry pump, the an compressor and an lift pump and the connections to the suction of the existing pump is being let on contract.

Ghaziabad—A distance was given to the Postmaster General in order that a proper water supply with an electric pump might be provided for the Ghaziabad post office.

Water supply—Three contracts have been let for this work, which comprises supply and erection of pumping plant, the supply and laying of water mains and construction of buildings and elevated tanks, and the supply of water meters. Tenders have been received and the board has accepted the recommendation made and the contracts have been placed.

Gorakhpur drainage—The main outfall works were completed at a cost of about Rs.31,000 and were handed over to the board in August, 1935. The board has in view a further instalment of the drainage system, estimated to cost about Rs.47,000.

Water supply maintenance—The adoption of continuous settlement recommended by the Mechanical Engineer has now been acted upon and has improved the quality of the water though alum is only used during the rains when the supply is turbid. Proposals for ammonia and chlorine treatment of the supply are at present being investigated. The Notified Area does not impose any general water tax and it is therefore handicapped in finding funds for extensions and improvements. The committee has taken certain steps which have proved beneficial in the reduction of waste, but much more remains to be done. The electrification of Haldwani would render an extension of the water supply less difficult and expensive. It is understood that the committee are negotiating with the Naini Tal Board for an electric supply.

Advice and estimates were furnished this notified area, comprising the installation of bulk meters and ammonium chloride dosing apparatus and other appurtenant work, the cost of which will be about Rs.11,000.

Hamirpur—An exploratory boring was carried out in the bed of the Rohine Nala for the purpose of ascertaining the nature of the sub-soil and its adequacy for bridge foundations.

Hapur Water Supply—The municipal board were furnished with advice and an estimate concerning a water supply to its municipality. These proposals are still under consideration.

Hardoi Drainage—Tenders were invited, a comparative statement was prepared and the contract let with the approval of the local authority for drainage work, which will cost over Rs.83,000.

Water Supply Maintenance—The waste prevention measures which have been regularly carried out since August last and the inauguration of a continuous supply to the public have had a very beneficial result. It is estimated that 10 million gallons of water have been saved by these measures and over 5,000 units of electricity during six months' working.

Most of this improvement is due to the twenty-four hours supply, as the waste prevention measures have only been successful to a limited degree, and it is possible that some of the underground mains are leaking. In his report the Mechanical Engineer has enumerated the measures which require careful consideration for further improvement of the water supply, such as small storage tanks for standposts, the metering of all supplies which are of a non-domestic nature, the insistence on house cisterns, the proper control and adjustment of all flushing tanks.

The use of a proper semi-positive type meter instead of the cheap inferential type is also recommended, as well as the provision of meter testing equipment and staff. The staff employed is not sufficient to meet the exigencies of work and references have been made to the board on this matter.

The accounts show that profits have fallen from Rs.24,000 to Rs.12,000 per annum, and in his report the Mechanical Engineer analyses the results and recommends that the cause of this fall in revenue be investigated. The revenue per thousand gallons supplied has fallen from 11·2 annas to 9·9 annas in a period of seven years. This investigation should not be delayed as the pumping capacity of the supply has been almost doubled by the bringing into use of the 4th tube-well, and losses may be seriously increased by lack of proper measures.

Hardwar water supply—A fourth tube-well which is being constructed in the office compound of the municipal board has been successfully developed, and an electro-motor driven airlift with a centrifugal pump has been installed and is at present undergoing test. This source will practically double the available supply to Hardwar Union.

FYZABAD—(contd.)

GHAZIABAD
(Meerut District).

GHAZIPUR.

GORAKHPUR.

HALDWANI.

HAMIRPUR
(District Banda).

HAPUR.

HARDOI.

HARDWAR.

HARDWAR.

The ammonia chlorinating plant for the Tibri reservoir which has been purchased is being erected and will ensure the purity of the water supply from the three original wells.

A reinforced concrete bridge connecting the island platform with the Jammu Palace steps, which was a part of the improvement work to the Muki-Pauri, has been finished and handed over to the board. This work had to be carried out in difficult conditions, as the water channel from the Brahm Kund had to be kept to its full supply level. The cost of this work was met by the generosity of a Hindu gentleman of Calcutta.

Drainage—The drainage scheme of Hardwar, which has for many years been the subject of controversy, has at last been sanctioned and tenders have been invited.

It has been found more economical to use steeper grades and pump the sewage near Mayapora than to follow the line of the original project and attempt to gravitate the sewage to the outfall. The sewage farm with a distributary has been included and the total cost of the work is estimated to amount to Rs.6.20 lakhs. This amount includes considerable sums for the surface work and surface drainage in addition to the foul water sewers.

Advice was given the board concerning the proper lighting of the Muki-Pauri island platform, as this platform is used by immense crowds, and the board has been advised by the Executive Engineer how to deal with this problem.

HATHRAS.

Hathras water supply—This supply was opened by His Excellency Sir Harry Haig, Governor of the Province, on 14th March, 1935. The plant maintains the guarantees of the manufacturers, and the system has worked satisfactorily.

The municipal board has encountered some difficulty in adhering to the water supply rules as certain influential persons object to meters and house service tanks. So far only about 100 private connexions have been granted, but a full standpost supply to the whole municipal area has been maintained. Considerable savings were effected in carrying out the work and the board has been advised to fit electrically operated level recorders in the balancing tank and a venturi meter recorder, so that a correct account may be kept of the water pumped. Continuous supply is at present maintained.

It is imperative that the municipal board should not lose control of the distribution in this town, as sweet water can only be obtained at great depths and with considerable difficulties owing to the intervening saline strata. More attention should be paid to preventing damage to standposts and fittings in this town.

Drainage—The board has now under consideration a comprehensive drainage work for the town and as a necessary preliminary has deposited a sum of Rs.2,500 with the Executive Engineer, I Division, for a detailed survey and levelling of all the mohallas in the town.

JAUNPUR.

Jaunpur Water Supply—This work has been delayed on account of an electric supply not being available. All the contracts which have been let for the water supply work are on the point of completion, but it is not possible to get the supply in running order until the end of the current year. The cost of this supply is estimated to amount to about Rs.2.13 lakhs.

Jaunpur Jail Water Supply—Advice was given concerning improvement of the water supply to the District Jail.

JHANSI.

Water Supply—A service reservoir in the vicinity of the city has been constructed at a cost of about Rs.56,000, and will shortly be brought into operation.

The Executive Engineer also furnished the board with a project for the addition of further pumping plant as recommended by the Mechanical Engineer, the cost of which is estimated to be about Rs.44,000.

Water Supply Maintenance—This water supply is far from satisfactory. The quantity afforded is insufficient, the hours of supply are restricted and water analyses are unsatisfactory. More equitable distribution is imperative. Much more water can be pumped from the storage reservoir if care in using the pumping plant was exercised. This pumping plant has now reached the end of its useful life and should be replaced. A reinforced concrete storage reservoir has been constructed to supply the city, and the board has in view the construction of another similar reservoir for civil lines. These service reservoirs will materially assist in maintaining a better supply. Chlorination of the water is also being undertaken. The method in which the water works accounts are maintained leaves much to be desired, for instance, no credit is shown for water supplied for municipal purposes, though there is reason to believe that excessive quantities are used. Many unmetered non-domestic connexions exist which should be metered under the rules. Inspection reports show that the board also maintain inadequate staff to run the water-works successfully. Several breakdowns were reported during the year.

Drainage—A drainage scheme is under consideration by the Board.

Khaga—Assistance was rendered to the Telegraph Department regarding a hand pump in the well at the post office at Khaga.

KHAGA (Patna District).

Water supply maintenance—The plant at this station has been fairly well maintained, but a duplicate set is urgently required to avoid serious interruptions of the supply when the existing set has to be overhauled.

KOSI.

The committee has accepted the Mechanical Engineer's advice and has inaugurated a twenty-four hours supply with beneficial results. Other recommendations of the Mechanical Engineer, such as the installing of storage cisterns being provided on the premises of private consumers and at the municipal gardens and the provision of reinforced concrete storage tanks in the vicinity of public standposts, an additional service reservoir, fire hose and petrol driven pumps for fire fighting purposes and the delegation of more authority to the Waterworks Superintendent, should be put into effect by the committee.

The waste which is almost negligible at Kosi shows signs of increasing and requires careful watching.

The soil at Kosi affects the galvanised iron fittings used for private connexions, and it is recommended that all such fittings should in future be wrapped and treated with special composition to prevent rusting and the ensuing waste of water.

Kotdwara water supply—Preliminary proposals were prepared and presented to the local authority for supplying this town with pure water, as the present source is from a canal subject to pollution. Proposals for improving the drainage of the town have also been made.

KOTDWARA.
(Garhwal District).

Water supply maintenance—The plant was maintained in a fairly satisfactory order throughout the year, but is stressed to its full capacity with inadequate standby. Loans will be required for further plant and bulk meters should be provided so that a more accurate account may be obtained of both the raw and filtered water pumped. During the year an important special casting was fractured at the Gaughat pumping station, which prevented the full supply of raw water being pumped to Aishbagh. This special piece was replaced and the shortage in the supply minimized as much as possible by special pumping arrangements. The time has now come when a new rising main from Gaughat should be constructed and steel pipes and specials used to obviate shortage which may take place owing to the difficulty with cast-iron special pieces failing under high pressure.

LUCKNOW.

In several places the mains have been built upon and cases have occurred where compensation has been claimed for damage to buildings owing to leaks from these mains. The first opportunity should be taken to remove such mains to positions where they are not likely to be encroached upon.

Recommendations have been made to the board for reorganizing its purification plant, for increasing the clear water storage capacity and improving the effectiveness of the settlement tanks all of which questions have been referred by the board to its consulting engineers and it is understood that the board is taking the necessary steps to obtain loans from Government to cover the cost of these capital works.

This board has effected more solid work in reduction of waste than any other municipality in the province not officially managed. It is to its credit that it succeeded in affording a twenty-four hours supply for several weeks during the hot weather of 1935 in spite of stout opposition. The board would have continued this supply but for an act of sabotage which seriously damaged one of the pumping sets. The board renewed during the year the services of its consulting engineers, Messrs. Lane Brown and H. White and effected a complete house-to-house inspection of the whole municipal area. The consulting engineer's report contains much valuable information and will enable a proper census of all connexions to be made as the existing records are defective. The experience which has been gained in these measures taken by the Lucknow board is of great value, and it will be found to benefit all other municipalities in the province that care to take advantage of it.

Drainage—The sewage pumping station cannot meet the sewage discharge and a nuisance is prone to take place by overflow of sewage into the Gumbi. During the past year public complaints were much in evidence concerning the serious state of the Gumbi due to the pollution. The proper course for the board to adopt would be to re-organize the pumping plant and substitute modern non-chokeable crude sewage pumps for several of the existing sets, which are now too small to meet the sewage flow and which require constant renewals and repairs and have now nearly reached the end of their useful life. This course of substituting modern plant would be an economy in itself as the repair charges would be almost negligible and the power bills would be much smaller.

Radical steps are also necessary to measure the sewage flow in a proper flume at the sewage farm and to strengthen the embankment in the sewage duct, which is now subject to breaching when three pumps are operated simultaneously.

The organization of the sewage farm and the increase of revenue therefrom is a matter recommended for the board's serious consideration.

LUCKNOW.—
(conclude).

Proposals on the Simplex system for the generation and use of sewage gas as a cheaper fuel than petrol for motor lorries were furnished to the board in case they either themselves decided on such an enterprise or intended to encourage this by private development.

It is understood that the board have extensions of the drainage in view and are taking advice of their consulting engineers on this. The new areas which are being developed and which have brought about an appreciable increase of population and property require urgent attention both as regards drainage and water-supply.

The Ghazi-ud-din Hyder Canal was maintained throughout the year, as well as the Goomti weir.

Assistance was given to the authorities in a project for the Red Cross Health Centre which is to be built in the vicinity of the Balrampur Hospital.

In order to test its suitability a grant was obtained from the Board of Public Health for constructing a tube-well consisting of locally made ear stainer. The tube was successfully sunk and the "Essbee" patent strainer fixed, and on test the well yielded 167 gallons per minute with a depression of 18 feet. It is proposed to use a deep well pump in this well.

Advice was given concerning the improvement of the Central Jail water-supply, and assistance was also given to the Commanding Officer, no. 2 Company, I. H. Corps, regarding a water-supply.

MERUT.

Water supply maintenance—This board is now affording a twenty-four hours supply to its public. There are still certain areas where there is a shortage in supply and which require effective attention. The consumers who are favourably situated on the rising main to the tubal tanks have so far not been disconnected nor they have been placed on a subsidiary main. Until this improvement is carried out the bulk of the public must remain handicapped as regards their legitimate supply.

Further storage capacity has been recommended but so far no action has been taken.

Slow sand filters have been resanded as recommended, with beneficial results, and a chlorinating apparatus has also been provided. The venturi meter, which was out of order for many years, has now been reinstated and regular records are now available of the supply pumped.

The returns which have been received from the board for their night tests indicate that the waste in this municipality is not of excessive dimensions.

No notice has been taken of the recommendation concerning increasing the staff to take care of the distribution.

The shortage of water in the high zone and the Civil Lines area is still as acute as ever. The best means of dealing with this is for the board to proceed on the lines recommended by the Executive Engineer, and to sever all private connexions from the rising main to the reservoir and lay a rider main for these connexions at a cost of about Rs 19,000. The supply has now become so short in the Civil Lines that some institutions are constructing wells and equipping them with electro-motor pumps.

Drainage—Some assistance was rendered by the municipal and the cantonment authorities regarding anti-malarial measures pertaining to the drainage of an area adjoining the Indian Military Hospital which lies between the municipal and cantonment boundaries.

MIRZAPUR.

Water supply maintenance—The Mechanical Engineer at his recent inspection succeeded in making temporary adjustments to the venturi meter mechanism, whereby some idea might be gained of the quantity of water which is drawn off from the reservoir. The results of this measurement are astonishing in that it is apparent that Mirzapur draws off about 40 gallons per head per day as an average, that is to say consumes by far the greatest supply per head in the province.

The distribution is in a deplorable state. A huge number of standposts has been provided, many at intervals of a few feet, all showing signs of inferior materials and workmanship and causing much loss of water through leakage. The number of meters in operation has dwindled to a few dozens, whilst the number of private connexions increases at a great rate. Great reluctance was noticed on the part of the board to carry out night tests, to tackle the waste problem, and complaints have been received from contracting firms that their bills have not been paid.

MOGHALSARAI.

Moghalsarai water supply—The Board of Public Health provided a grant on the usual conditions for trial boring at Moghalsarai to enable the local authority to provide a public water supply in its area. Tenders for this work will be invited as soon as land for the well has been acquired.

MORADABAD.

Moradabad water supply—The Moradabad water supply, which was taken over on licence from the board by Messrs. Noorullah Ghazanfarullah, continues to

function satisfactorily. The pumping plant has been reinstated and all demands met.

Advice was given to the board concerning the construction of the infectious diseases hospital, and proposals for the improvement of the town drainage were provided in the previous year.

Water supply maintenance—The main defect in this water supply is the fact that the board will not extend the hours of supply, which are far too short for the requirements of the public. This procedure fosters the waste of water, as the public is apt to keep taps open continuously with the object of filling receptacles during the pressure hours so that there may be sufficient water during non-supply hours. It is not possible now to maintain any height of water in the existing service tanks, though additional storage has been often recommended. No bulk meter has been provided so that a check may be kept on the quantity of water pumped, and the consumption figures reported are merely guess work and of little use for purposes of record or comparison. The number of standposts and private connexions has appreciably increased, but no house cisterns or storage tanks have been erected in conjunction therewith. The condition of the supply is therefore becoming worse as time proceeds.

The board has not appointed any staff to enable a proper control to be maintained on the distribution, over the detection and prevention of waste. The waste which takes place amounts to about 30 per cent. of the total supply pumped, and no action has been taken on the results of the night tests. The accounts of this water supply are not satisfactory in that proper credits are not allowed for charitable supplies and water used for municipal purposes. Many non-domestic supplies exist which ought to be metered.

Drainage—The method of pumping the sewage is objectionable, as the sewage is allowed to back up on the main sewers for long distances and deposit its solids in the sewer. This has to be dug out at a great expense. The overflow is allowed to operate much too frequently, thereby defiling the bathing ghats and defeating the prime object of the sewage disposal work. The sewage pumping plant, screens, and the rakes as well as the elevators have been maintained in fairly good condition.

Certain repairs were carried out to the infectious diseases hospital—a grant of over Rs.5,300 being made by the Board of Public Health for this purpose.

Water supply maintenance—The pumping plant stations are very well maintained and reflect credit on the board's staff. The board have obtained the necessary loan funds to undertake the urgently required reorganization, and this work is already in hand according to programme. There is a shortage of water during the summer months, and the question of waste prevention as well as the impounding of further springs is engaging attention. Since the distribution systems have been taken over by the hydro-electric staff a great improvement has taken place, and much water is being saved and a marked increase in revenue has been recorded.

Much work still remains to be done, particularly in re-zoning the supply, as the pressures are excessive in many areas and much leakage and waste is attributable thereto. The inspections which are regularly carried out have enabled many leaks to be detected and repaired. The abuse of meter mechanism, which is a feature of this supply, requires more effective action to prevent fraud. The board have wisely increased the staff and the benefit is already evident.

Hydro-electric supply—The plant and buildings have been well maintained and the settling tanks have fully justified their construction both as a means of preventing the sediment reaching the turbines and as storage reservoirs.

The new diesel set which is urgently required at the Kaulagarh station is being ordered; until it is installed and set to work some anxiety must prevail, as the land slip above the Galogi station still threatens and the present diesel station is of itself insufficient to meet the existing load. The pelton wheel set which has recently been reconditioned with a new governor at Galogi has proved to be of great service. The voltage and the power factor of the supply generally is very unsatisfactory, and steps to maintain the declared voltage as well as to improve the power factor should not be delayed as the requirements under the Act are at present not being fulfilled.

Drainage—Steps which were taken in the Butcher Khana ravine to deal with the crude sewage have proved very effective and the nuisance complained of by the Toneta villagers in Tehri State has now been completely done away with.

Full benefit of the existing sewers is not taken advantage of, and the board would be wise if they insisted on more residences being connected to the drainage system.

MORADABAD—
—(concluded).

MUTTRA.

MUSSOORIE.

MULAFFARNAGAR.

Drainage—At the request of the board the Executive Engineer is preparing an estimate for repairing the drainage and improving the open outfall drains, which have been damaged by floods and the condition of which has been defective for some years.

NAINI TAL.

Water supply maintenance—The plant has been maintained in good order, but the buildings in places require more attention. The plant is however stressed to its limits, and overheating of the motors has been experienced for some time, particularly at the lakeside pumping station. Night tests indicate that only a small percentage of the water pumped is put to proper use and many serious leaks have been discovered in the process of carrying out these tests. Meters generally in this municipality have been allowed to remain in position for years without attention or recalibration, and the majority run slow and deprive the board of a fair share of its legitimate revenue. The chlorinating plant is not of sufficient capacity to deal properly with the present supply. Though the shortage has been noticed for some years past, no steps have been taken to radically deal with the circumstances.

The staff arrangements leave much to be desired, and the Electrical and Mechanical Engineer is handicapped by lack of proper skilled assistance.

The zoning of the supply to prevent excessive pressures taking place in certain localities, thereby facilitating waste, has not received the attention due to it.

Hydro-electric supply—The Mechanical Engineer furnished the board with a detailed report concerning the position of the lake supply. Although the original proposals were sanctioned with a proviso that not more than 3½ ft. of the depth of the lake should be run off for power purposes, yet during last year over 6 ft. has been used for this purpose. The time has now come when little more than a foot of water remains above the rock barrier at the Tali Tal inlet and when unsightly foreshores are being uncovered on the lake side.

Suggestions were made to provide an extension of the supply to Bhowali and Kinnam generally, the revenue from which would cover the capital required to either develop the Blumfild catchment as another source of power or construct a generating station at Kathigodam for the same purpose. Haddwani and Kathigodam as well as Ramkhet and Almora have also intimated their desire to participate in such a supply. There is evidence to show that scope exists for private enterprise in such a scheme, provided the Naini Tal supply is made over to a public concern, and the board have been informed of this possibility. Rumours concerning serious leakage from the lake which have spread about have proved baseless, since the leakage from the lake through all known springs has been recently measured and found not to vary appreciably from the flow which was measured before the undertaking was put in hand in 1919.

NAJIBABAD.

Drainage—At the request of the local authority the Executive Engineer prepared a forecast of cost for a comprehensive drainage scheme for Najibabad, costing Rs 1·74 lakhs.

ORAI.

Water Supply—This town possesses only a brackish water supply from surface wells. Thanks to the Board of Public Health funds were made available for a trial boring, which was carried down to almost 280 feet below ground level, strainers being fixed 245 feet below ground level. This well has proved successful and a sweet water supply is now assured to Orai as soon as the local authority can find the capital to proceed with the work.

PANTNAGARH.

Water Supply—This municipality has applied to the Board of Public Health for funds on the usual terms to construct a tube-well, which it is hoped will be successful and may become the source of the municipal water supply. The cost of the well is estimated to amount to about Rs.9,500, whilst the cost of the water supply to the town is estimated to be about Rs 70,000.

UNAO.

Water Supply Maintenance—This municipality has made very creditable efforts to follow the advice given by inspecting officers and deserves to be congratulated on the results which it has attained. In spite of some opposition it has succeeded in inaugurating a twenty-four hours supply with a marked reduction in daily demand, and has applied meters to all private connexions. Night tests results show a progressive diminution, and the pressures everywhere in the distribution have increased. The plant has been fairly well maintained, but the services of a skilled fitter are imperative for proper work.

Drainage—The drainage pumping station is also in a satisfactory state of repair but the quantity of sewage delivered at the pumping station is as yet insufficient to establish a proper sewage farm. The board have in view an extension of their drainage work. Taking into consideration all the difficulties which this board has encountered, it deserves credit for its efforts and should be in a favourable position when competing with other boards for assistance from Government.

A project for the drainage of Stevensonganj, estimated to cost about Rs.35,000, was provided the local authority.

Mr. G. McO. Hoey held the post of Superintending Engineer, throughout the year.

STAFF

Mr. H. G. Trivedi held the post of the Executive Engineer, 2nd Division, until the 12th of October, when on relief he proceeded to Meerut and took over charge of the 1st division from Mr. Puran Mal, who officiated in the place of late Mr. Walter Saise.

Mr. F. D. Tunnicliffe held charge of the 2nd division from the 14th of October till the end of the year.

Mr. N. D. Chaudhury held charge of the Well Boring Operations division, except for a period of about four months during which time Syed Maqbool Husain acted for him.

Mr. C. W. Cassé held the post of Mechanical Engineer for Waterworks throughout the year. The post of Personal Assistant to the Superintending Engineer was held by Mr. K. Chattopadhyaya throughout the year, except for a short period whilst he was on sick leave, when Mr. Musaddi Lal officiated.

Mr. N. B. Gupta was permitted to proceed to England on study leave for a period of eight months.

Three permanent assistant engineers, four temporary assistant engineers, nine overseers and ten temporary subordinates with the required number of computers, draftsmen and clerical staff were employed during the year.

The work of this Department has markedly increased in recent years and owing to the shortage of staff many demands made by local authorities could not be attended to.

The staff deserve special mention for the manner in which they have striven to meet the heavy work and many members have had to work overtime and forgo their holidays in order to meet urgent demands. The attention of Government has been drawn to this state of affairs.

Assistance was rendered by members of the staff in the examinations of the Thomason Civil Engineering College, Roorkee, and of the Lucknow University both for examinations and lectures.

The Superintending Engineer served on the United Provinces Town Improvement Trust Committee and on the Advisory Council of the Thomason Civil Engineering College, as a representative of the Institution of Civil Engineers.

LUCKNOW:

Dated 14th May, 1936.

G. McO. HOEY, I.S.E.,

INST. C.E.,

Superintending Engineer.

LUCKNOW:

Dated 9th July, 1936.

F. D. TUNNICLIFFE, M.C.,

ASSOC. M. INST. C.E.,

Offg. Superintending Engineer.